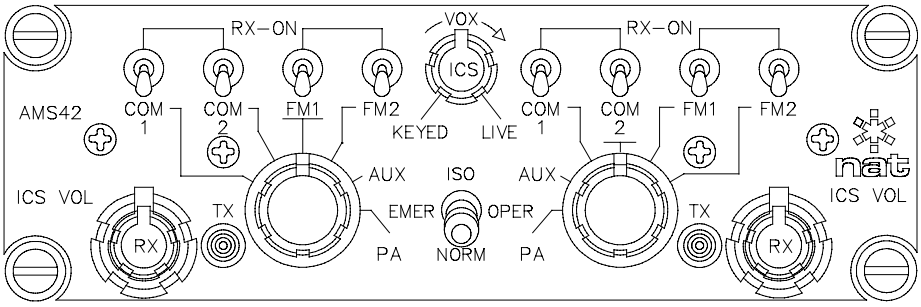
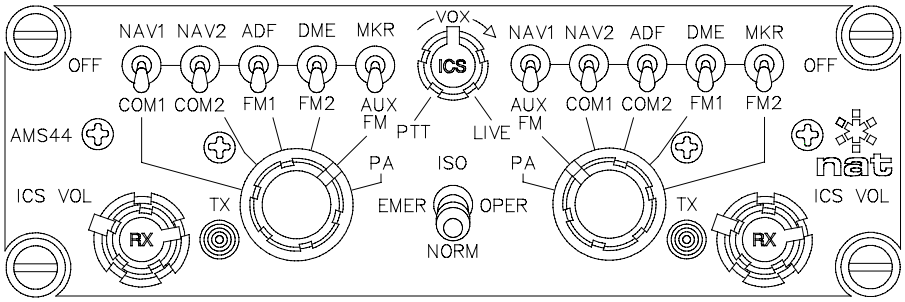
SM19

AMS42/AMS44 Series
Dual Channel Audio Controllers





INSTALLATION AND OPERATION MANUAL

REV 4.00 November 21, 2003

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Periodically NAT will release manual amendments. In order to maintain the most accurate and up to date manual these amendments should be carried out immediately upon receipt and recorded on the following amendment record.

AMENDMENT RECORD

Amendment Number	Amendment Date	Section(s) Changed	Date Entered	Entered By
1	Jul 30, 2004	2		**Performed at Factory**
2	Feb 15, 2005	Title, 2		**Performed at Factory**
3	May 27, 2008	2		**Performed at Factory**

Insert any Amendment Instruction sheets after this page.

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INSTALL_OPS
MANUAL AMENDMENT

Manual: SM19 (AMS42/44)	**Amendment #: 3**
Document # SM19\Install_Ops\809-0003	**Amendment Date:** May 27, 2008

The purpose of this amendment is to add the latest drawings to the manual.

Amendment Instructions:

1

Remove Pages	Replace With Pages
2-7 Rev 4.00 Amendment 2	2-7 Rev 4.00 Amendment 3

2

Remove Drawings (Section 2)	Replace or add Drawings (Section 2)
-	AMS42\922-0 Rev 1.10
AMS44\905-1 Rev 1.02	AMS44\905-0 Rev 1.03
-	AMS44\922-0 Rev 1.10

3 Update the Amendment Record sheet at the front of the manual.

4 Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages

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INSTALL_OPS
MANUAL AMENDMENT

Manual: SM19 (AMS42/44)	**Amendment #: 2**
Document # SM19\Install_Ops\809-0002	**Amendment Date:** Feb 15, 2005

The purpose of this amendment is to add a wiring note to the Cautions section of the manual, to insert the latest wiring specifications, and to add Install Kit information.

Amendment Instructions:

1

Remove Pages	Replace With Pages
Title section page iii Rev 4.00	Title section page iii Rev 4.00 Amendment 2
2-1 and 2-2 Rev 4.00	2-1 and 2-2 Rev 4.00 Amendment 2
2-7 Rev 4.00	2-7 Rev 4.00 Amendment 2

2 Update the Amendment Record sheet at the front of the manual.

3 Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages

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INSTALL_OPS
MANUAL AMENDMENT

Manual: SM19_AMS42_AMS44 **Amendment #: 1**
Document # SM19\Install_Ops\809-0001 **Amendment Date:** Jul 30, 2004

The purpose of this amendment is to add the most recent Installation Drawings to the manual.

Amendment Instructions:

1

Remove Pages	Replace With Pages
2-7 Rev 4.00	2-7 Rev 4.00 Amendment 1

2

Remove Drawings (Section 2)	Replace or add Drawings (Section 2)
AMS42\403-0 Rev 1.01	AMS42\403-0 Rev 1.11
AMS42\403-1 Rev 1.10	AMS42\403-1 Rev 1.11
AMS42\403-2 Rev 1.02	AMS42\403-2 Rev 1.11
AMS42\405-0 Rev 1.00	AMS42\405-0 Rev 1.01
AMS44\403-0 Rev 1.01	AMS44\403-0 Rev 1.03
AMS44\403-1 Rev 1.01	AMS44\403-1 Rev 1.03
AMS44\403-2 Rev 1.01	AMS44\403-2 Rev 1.03
AMS44\405-0 Rev 1.01	AMS44\405-0 Rev 1.02

Note: Ensure that all drawings are inserted in the order shown on the latest drawing lists.

3 Update the Amendment Record sheet at the front of the manual.

4 Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages

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Section 1.0 Description

1.1 Introduction

This manual contains information on the AMS42 and AMS44 Dual Channel Audio Controllers.

Information in this section consists of purpose of equipment, features and specifications.

1.2 Purpose of Equipment

The AMS42 and AMS44 are dual channel audio controllers that provide central control of all aircraft audio. They allow selection of transmit and receive audio, emergency operation and provide LIVE, KEYED, or VOX intercom. Support for the pilot, copilot and five passengers is provided as well as left or right side pilot configurations.

The purpose of the AMS42 and AMS44 is to provide centralized control for all audio in the aircraft. This is accomplished by providing positions for up to five transceivers and up to eight navaids. Other functions such as external PA interface, boom mic support for the pilot and copilot, seven place intercom, emergency and ISO operation, two direct audio inputs and rear hand mic operation are also provided.

1.3 Design Features

The AMS42 and AMS44 can be easily configured at the time of installation for pilot operation from the left or right side of the controller by selection of internal jumpers and switches accessible through the top cover. The five passenger positions are also configurable for left or right side operation.

Both controllers provide independent volume control of S/T (sidetone), ICS (intercom) and RX (receive) audio for left and right side users.

Both controllers utilize active bandpass filtering for RX and ICS operation for maximum audio clarity in high ambient noise conditions.

1.3.1 Transmit Functions

Both controllers provide equal transmit capability between left and right sides and support the use of a hand microphone. The hand mic is internally configured for left or right side operation, and is connected directly to the selected radio for use during emergency or equipment failure situations.

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During transmit operation, the sidetone of the transceiver in use remains enabled while all other audio, except DIRECT 2, is muted. This function is specific to each 'side' of the audio controller.

Transceiver interfacing is accomplished through directly switched microphones and ground referenced keylines. To ensure maximum radio compatibility, no diodes or other steering components are used.

1.3.2 Receive Functions

Selecting a transceiver with the TX (transmit) rotary selector automatically selects the associated receive audio. The RX inputs are also selected by the 3-position center-off front panel switches, five on each side of the audio controller – the 'up' position selects the respective navaid input, and the 'down' position selects the repective COM.

Two Direct Audio inputs are provided and are configurable for left or right side use.

1.3.3 ICS Functions

LIVE, KEYED or variable VOX ICS operation can be selected from a single control.

The AMS42 and AMS44 use dynamic noise reduction and voice band filtering to provide the clearest possible ICS audio in high ambient noise conditions.

Transparent ICS for either the pilot or copilot allows immediate transmit operation with no control panel switching. Return to ICS operation is automatic upon completion of the TX operation.

Isolation and Emergency modes of operation are provided to remove the pilot(s) from the intercom bus without interfering with normal passenger ICS.

Both controllers provide an ICS Tie line for multiple controller installations.

1.4 Specifications

1.4.1 Electrical Specifications

Input Power	Typically +22 to +32 Vdc at 250 mA Nominal +28 Vdc
Lighting	160 mA at 28 Vdc. 600 mA at 5 Vdc.
Microphone Requirement	'Carbon equivalent' 250 mV into 150 Ω min. (David Clark M1/DC, M3, M4, M7 recommended)

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Receive Audio Requirement	25 mW into 600Ω
Headset Power	250 mW per channel into 600 Ω
Key Logic	Ground seeking for all lines. 'Hard' ground outputs to all transceivers. TX LED on front panel lights when any transmit key input is low *except* hand mic.
Cross-Talk	De-selected inputs 50 dB min. below full output
Bi-directional ICS Tie Line	340 mVrms for full output 1.6 kΩ input impedance

1.4.2 Physical Specifications

Height	1.88" (47.8 mm) max.
Length	6.77" (172.0 mm) max. from back of mounting surface and excluding mating connectors
Width	5.75" (146.1 mm) max. front panel 5.00" (127.0 mm) max. rear enclosure
Weight	2.3 lbs (1.04 Kg)
Mounting	Standard Dzus Mounting (four fasteners) Optional Tray Mount

1.4.3 Environmental Specifications

Temperature	-20 to +55° C (ambient) -55 to +85° C (survival)
Altitude	25,000 feet max.
Humidity	95% Non-condensing
Shock	12g (any axis)
Vibration	Conforms to DO-160B category 'P'

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1.5 Unit Nomenclature

The AMS42/44 series are designed to be generic, fixed attribute audio controllers. For this reason a limited number of models is available. Custom dual channel audio controllers based on the AMS42 are renamed AA92H series and units based on the AMS44 are renamed AA94 series.

The models available are:

AMS42	5 front panel selectable transceivers. 8 internal selectable RX inputs. 2 Direct Audio Inputs.
AMS42F	Same as AMS42 with faceplate labeling change from COM2 to AUX1 to match OAS/USFS requirements.
AMS42T	AMS42 in tray mount configuration.
AMS42FT	Combines ‘F’ and ‘T’ models.
AMS44	5 front panel selectable transceivers. 5 front panel selectable navaids. 2 internal selectable RX inputs. 2 Direct Audio Inputs.
AMS44T	AMS44 in tray mount configuration.

End of Section 1.0

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Section 2.0 Installation

2.1 General

Installation information in this section consists of unpacking and inspection procedures, installation procedures, post-installation checks and installation drawings. Check all notes and cautions before installation.

2.2 Unpacking and Inspection

Unpack the equipment carefully and locate the warranty card. Inspect the unit visually for damage due to shipping and report all such claims immediately to the carrier involved. Note that each complete unit should have the following:

- Warranty Card.
- Certificate of Conformity.
- AMS42 or AMS44 Dual Channel Audio Controller
- Operator's Manual

Verify that all items are present before proceeding and ***report any shortage immediately to your supplier.***

Complete the warranty card information and send it to NAT when the installation is complete. If you fail to complete the warranty card, the warranty will be subsequently activated on the ***date of shipment from NAT.***

2.3 Continued Airworthiness

Maintenance of the AMS42 or AMS44 Dual Channel Audio Controller is 'on condition' only. Periodic maintenance of this product is not required.

2.4 Installation Procedures

2.4.1 Warnings ←*IMPORTANT!*

Do not bundle any lines from this unit with transmitter coax lines. Do not bundle any lines from this unit with 400 Hz synchro wiring, or AC power lines. Failure to observe these limitations may result in incorrect or intermittent operation, or severe audio interference on received and transmitted signals.

2.4.2 Cautions

In all installations, use shielded cable exactly as shown and ***ground as indicated***. Significant problems may result from not following these guidelines.

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All audio installations can be seriously degraded by incorrect wiring and shielding, and may result in abnormal cross-talk, hum and ground-loop noise. Be especially careful with all microphone wiring and Tie Line wiring, as these lines carry the lowest level signals in the aircraft.

All microphone and headset jacks should be electrically isolated from the airframe or significant ground loop noise may result.

Failure to follow the installation and wiring instructions provided in this manual for power and ground connections, including the rating of the circuit breaker, may lead to damage in the power input circuitry of the unit.

2.4.3 Cable and Wiring

All unshielded wire shall be selected in accordance with AC43.13-1B Change 1, Paragraphs 11-76 through 11-78. Wire types should be to MIL-W-22759 as specified in AC43.13-1B Change 1, Paragraphs 11-85, 11-86, and listed in Table 11-11. For shielded wire applications, use Tefzel MIL-C-27500 shielded wire with solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the wiring diagrams in Section 2.6 as required.

Allow 3" from the end of the wire to the shield termination to allow the connector hood to be easily installed. Note that the hood is a "clamshell" hood, and is installed after the wiring is complete. Aircraft harnessing should permit the unit to be lowered from the panel for easy access to all side adjustments. Do NOT mount the unit until all adjustments have been carried out.

All wiring should be at least 24 AWG, except power and ground lines, which should be at least 20 AWG. Ensure that the ground connection is clean and well secured, and that it shares no path with any electrically noisy aircraft accessories such as blowers, turn and bank instruments or similar loads. Power to this unit must be supplied from a separate breaker (1 Amp) or fuse (1 Amp fast blow), and not attached to any other existing breaker without additional protection.

Before the unit is mounted, make all functional tests and trimpot adjustments. Be sure the harness has enough clearance to permit the unit to be dropped down for re-adjustment, if needed later. Make sure that the connector locks are tightened, and the unit is securely fastened to the panel **before any flight is attempted**.

2.5 Adjustments and Connections

The unit ships from the factory with all internal adjustments set to the normal test levels. Once installed in the aircraft, it may be desirable to change some of these settings to best suit the local operating environment. The internal adjustments are located on the top and sides of the unit, and are as follows:

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2.5.1 Top panel adjustments

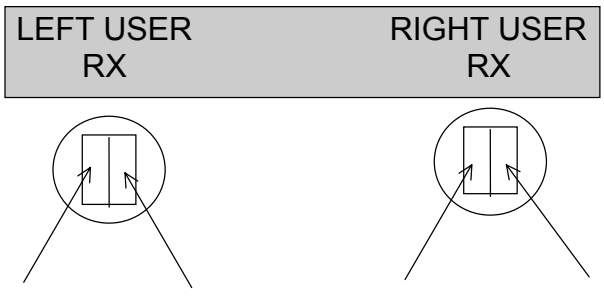
2.5.1.1 Receive Selection Switches

AMS42: The receive selection switches for the navaids are two banks of rocker switches accessible through the top cover. The right side of the controller responds to the switches labeled **RIGHT USER RX** and the left side responds to the switches labeled **LEFT USER RX**. Each switch can be individually selected or deselected by toggling the position of the switch. To select 'on' press the switch downwards at the end nearest the front of the unit (numbered 1 - 8), and to select 'off' press downwards at the end nearest the back of the unit (marked OPEN.) When viewed from the front of the unit, the switches toggle the navaids on or off from left to right as follows:

	OPEN							
Switch Function	TAPE Right	TAPE Left	AUX2	AUX1	ADF2	ADF1	NAV2	NAV1 .
Switch #	8	7	6	5	4	3	2	1

Note: These inputs are normally selected OFF (OPEN) when the unit is shipped from the factory.

AMS44: The receive selection switches are two pairs of rocker switches accessible through the top cover. The right side of the controller responds to the switches labeled **RIGHT USER RX** and the left side responds to the switches labeled **LEFT USER RX**. TAPE R/L position is selected on or off by these switches. Each switch can be individually selected or deselected by toggling the position of the switch between on (pressed downwards at the end nearest the front of the unit) and off (pressed downwards at the end nearest the back of the unit.)



TAPE Right **TAPE L**eft **TAPE R**ight **TAPE L**eft

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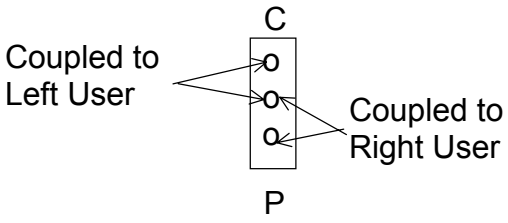
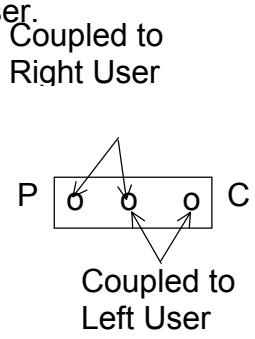
2.5.1.2 **DIR AUDIO** Inputs

These are coupled directly to either the Right User (P) or Left User (C) of the controller by jumpers accessible through the top cover and labeled **DIR AUDIO #1** or **DIR AUDIO #2**. The factory setting is for coupling to the Right User.



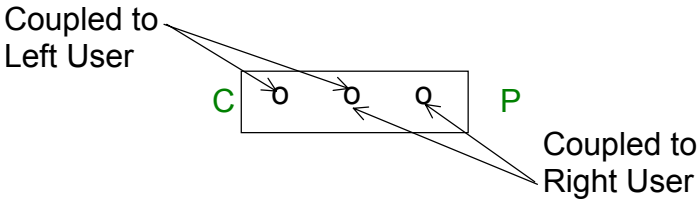
Couplings for **DIR AUDIO #1**



Couplings for **DIR AUDIO #2**

2.5.1.3 Intercom Isolation (ICS ISO)

The front panel mode switch can be used to isolate either the left (copilot) or right (pilot) user by using the jumper labeled **ICS ISO**, which is accessible through the top cover. It is normally set for isolation of the right user when the unit is shipped from the factory.



2.5.2 Right Side Adjustments

2.5.2.1 Sidetone (**LEFT USER S/T** and **RIGHT USER S/T**)

The Left User and Right User transmit sidetone (S/T) can be adjusted using the pots accessible through the right side of the case. Rotating the pots clockwise increases the sidetone, and counterclockwise reduces it.

2.5.2.2 **ICS TIE LEVEL**

This factory-preset pot may be covered by an adhesive disc to prevent field adjustment. **Under normal operation this pot does not need to be adjusted. Any adjustment should be carried out by qualified personnel only!**

2.5.2.3 **ICS GAIN LEVEL**

This factory preset pot may be covered by an adhesive disc to prevent field adjustment. **Under normal operation this pot does not need to be adjusted. Any adjustment should be carried out by qualified personnel only!**

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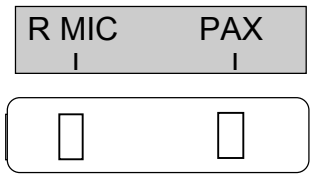
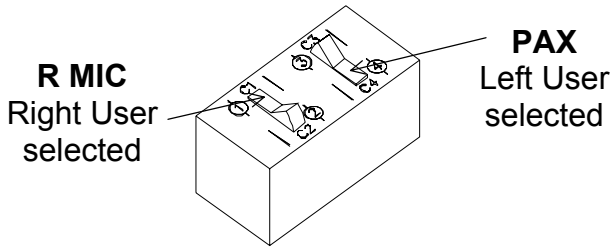
2.5.2.4 Rear Hand Mic (**R MIC**) and Passenger Headphones (**PAX**)



Switch Positions



Selection Examples

Rear Hand Mic (**R MIC**)

The **R MIC** rocker switch programs the Rear Hand Mic for functioning through the left or right TX selector switch. The position of the switch can be toggled between Left User (pressed downwards at the OUTBOARD end), or Right User (pressed downwards at the INBOARD end.) It is factory pre-set to select the Left user.

Note: The TX annunciator will not light when the hand mic is used.

Passenger Headphones (**PAX**)

The **PAX** rocker switch programs the passenger headphones to the headphone audio selected by either the Left User or the Right User. The position of the switch can be toggled between Left User (pressed downwards at the OUTBOARD end, or Right User (pressed downwards at the INBOARD end.) It is factory pre-set to select the Left user.

2.5.2.6 **DIR #1 AUDIO LEVEL**

The **DIR #1 AUDIO LEVEL** can be adjusted using the pot accessible through the right side of the case. Rotating the pot clockwise increases the sidetone, and counterclockwise reduces it.

2.5.3 Left Side

A red LED can be seen through the aperture marked **POWER ON**. This illuminates to indicate that the power supply is connected to the unit.

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2.5.4 Post-Installation Checks

With the controller disconnected from its mating connector, check P101 pin **<17>** for +28 Vdc relative to ground, and check P101 pin **<34>** for continuity to ground (below 0.5 Ω). Check P102 pin **<19>** for the presence of the lamp dimmer voltage. Check all mic, phone, music, and key lines for shorts to ground or adjacent pins. Check all key lines for correct operation. ***Do not attach the audio controller until these conditions are met.***
Power up the aircraft's system with the unit installed and turn on the radios and accessories required for the system. Refer to Section 3.0 for operation and set-up information.

Start with only the pilot's headset installed. Check for correct ICS, radio, and transmit operation. Do not proceed until the radios are functioning correctly. The S/T (sidetone) adjustment accessible through the right side of the controller and the transceiver internal adjustment may have to be adjusted for correct balance for the pilot and copilot. Adjustment of the individual radio RX levels should be set first, *then* the front panel RX master volume control.

Unusual buzzes, hums or other background audio are symptomatic of multiple grounds or noisy external systems sharing the same wire bundle. Note that incorrect jack wiring is a common fault, especially for passenger stations, and may cause loss of audio, a tone on the headset lines, or other problems. Failure to key or correctly modulate a transceiver may be caused by missing grounds on the radio or audio controller.

Plug in the hand mic and test for correct operation. Note that wiring faults for this accessory may cause peculiar loss of ICS or TX functions because it has over-riding priority in the system.

Plug in the remaining headsets and check for proper operation.

Note: an incorrect drop cord or improper jack wiring may cause a wide range of problems from loss of audio to a tone heard in the headset.

Check levels and operation of all functions in flight to ensure proper adjustments and settings have been made.

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2.5.5 Accessories Required But Not Supplied

Installation kit AA90-IKC (Alt. part No. D50S37SL-IKC) is required to complete the installation. The kit consists of 1 50-Pin D-min Female Crimp Kit (D50SL-IKC) and 1 37-Pin D-min Female Crimp Kit (D37SL-IKC).

D50SL-IKC consists of

Quantity	Description	NAT Part #
1	D-min 50 Socket Housing	20-21-050
50	MS Crimp Socket	20-26-901
1*	Jack Screw Set	20-27-002
1*	Lock Clip Set	20-27-004
1	50 Pin Connector Hood	20-29-051

D37SL-IKC consists of

Quantity	Description	NAT Part #
1	D-min 37 Socket Housing	20-21-037
37	MS Crimp Socket	20-26-901
1*	Jack Screw Set	20-27-002
1*	Lock Clip Set	20-27-004
1	37 Pin Connector Hood	20-29-038

* Use as required.

2.6 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE	SERIAL No.
AMS42				
AMS42\403-0	1.11	AMS42 Dual Channel Audio Controller	Interconnect	All
AMS42\403-1	1.11	AMS42 Dual Channel Audio Controller	Interconnect	All
AMS42\403-2	1.11	AMS42 Dual Channel Audio Controller	Interconnect	All
AMS42\405-0	1.01	AMS42 Dual Channel Audio Controller	Connector Map	All
AMS42\905-0	1.01	AMS42 Dual Channel Audio Controller	Faceplate	All
AMS42\922-0	1.00	AMS42 Dual Channel Audio Controller	Installation Diagram	Up to 2445
AMS42\922-0	1.10	AMS42 Dual Channel Audio Controller	Installation Diagram	2446 and up
AMS44				
AMS44\403-0	1.03	AMS44 Dual Channel Audio Controller	Interconnect	All
AMS44\403-1	1.03	AMS44 Dual Channel Audio Controller	Interconnect	All
AMS44\403-2	1.03	AMS44 Dual Channel Audio Controller	Interconnect	All
AMS44\405-0	1.02	AMS44 Dual Channel Audio Controller	Connector Map	All
AMS44\905-0	1.03	AMS42 Dual Channel Audio Controller	Faceplate	All
AMS44\922-0	1.00	AMS Series Dual Channel Audio Controller	Installation Diagram	Up to 2645
AMS44\922-0	1.10	AMS Series Dual Channel Audio Controller	Installation Diagram	2646 and up

Section 2.0 ends after these drawings

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REVISIONS			
REV	DESCRIPTION	DATE	BY
	FOR PREVIOUS REVISIONS REFER TO 403-0101.DWG, 403-1110.DWG AND 403-2102.DWG.		
1.11	ECR #598 – REFER TO ECR.	MAR 26/03	TAT/MS

AMS42 INSTALLATION NOTES

NOTES:

1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE SPECIFIED. ALL WIRE SHOULD BE IN ACCORDANCE WITH MIL-W-22759. ALL SHIELDED WIRE/CABLE SHOULD BE IN ACCORDANCE WITH MIL-C-27500.

△2 HEADSET, MICROPHONE AND ICS TIE LINES USE TWISTED SHIELDED PAIR. CONNECT SHIELDS TOGETHER AND GROUND TO CLEAN AIRCRAFT GROUND. GROUND POINT SHOULD BE THE SAME AS AIRCRAFT AUDIO SYSTEM POWER GROUND.

△3 DO NOT GROUND MICROPHONE OR HEADSET LO CONNECTIONS TO AIRFRAME.

△4 ADJUSTABLE LEVEL DIRECT AUDIO INPUT, AMPLIFIED.

△5 FIXED LEVEL DIRECT AUDIO INPUT. NO ADJUSTMENT. DO NOT PARALLEL FROM SINGLE SOURCE AUDIO TO OTHER AUDIO CONTROL PANELS.

△6 AIRCRAFT ENTERTAINMENT SYSTEM (MUSIC) MUST BE GROUND REFERENCED. IF NOT, A FLOATING GROUND ADAPTER BETWEEN THE AUDIO CONTROLLER AND ENTERTAINMENT SYSTEM WILL BE REQUIRED.

△7 FOR MOD 9 UNITS ONLY. THESE ARE N/C FOR ALL OTHER UNITS.

△8 TO BE USED FOR EXPANSION OF INTERCOM SYSTEM ONLY. REFER TO INSTALLATION MANUAL FOR DETAILS.

DEFINITIONS:

N/C: NO CONNECTION. THE PIN IS NOT CONNECTED TO ANYTHING INTERNALLY, AND THEREFORE SHALL HAVE NO CONNECTION EXTERNALLY.

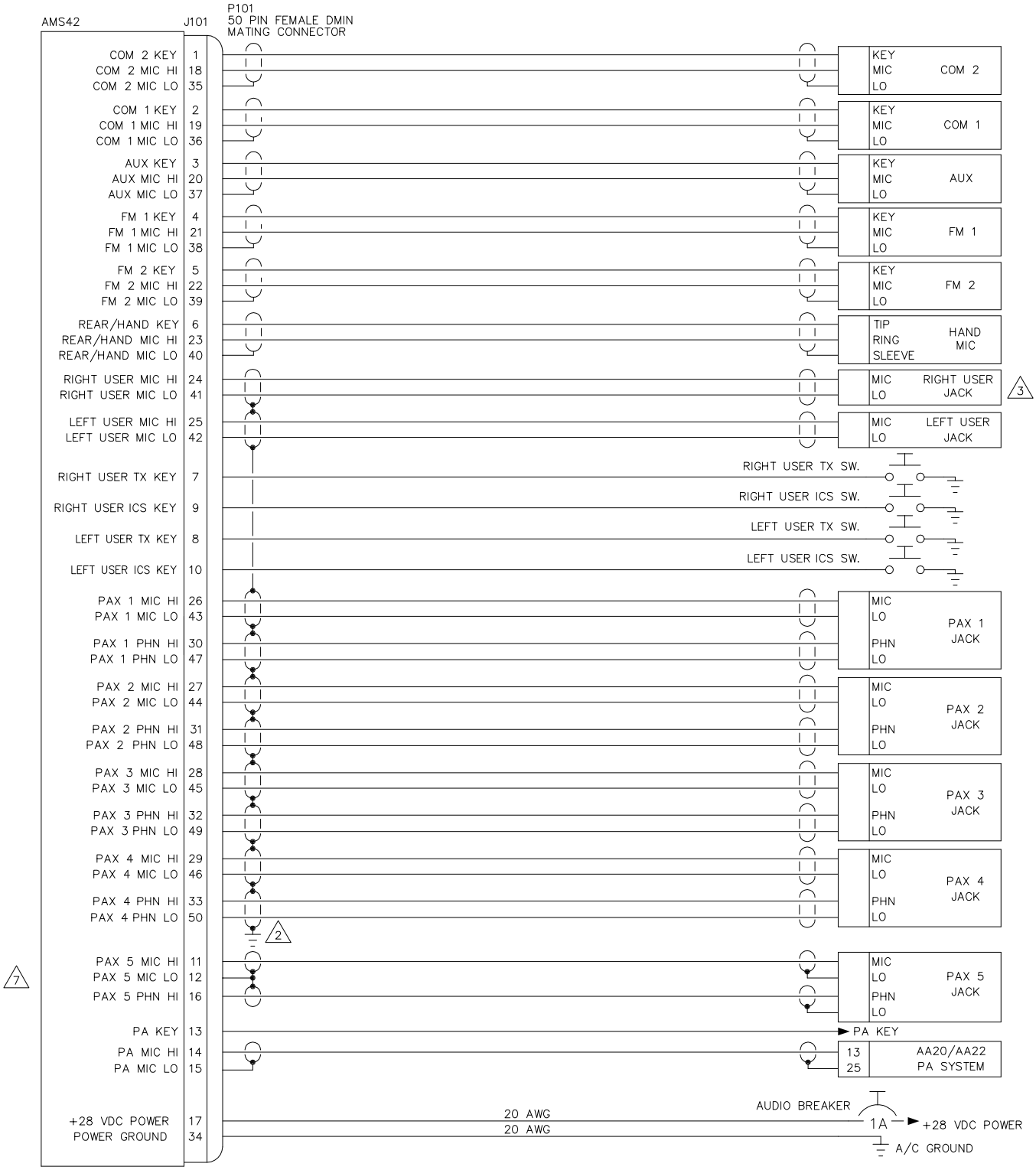
N/C SPARE: NO CONNECTION INTERNALLY, BUT A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

RESERVED: MAY BE CONNECTED AND USED IN THE FUTURE. THE CIRCUITRY MAY BE PRESENT OR ADDED TO ACTIVATE THE FUNCTION. THE PIN MAY BE USED FOR TEST PURPOSES. THERE IS NO EXTERNAL CONNECTION.

RESERVED SPARE (RSV SP): RESERVED, BUT INSTRUCTIONS SHALL BE FOLLOWED TO ACTIVATE THE CIRCUITRY. A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

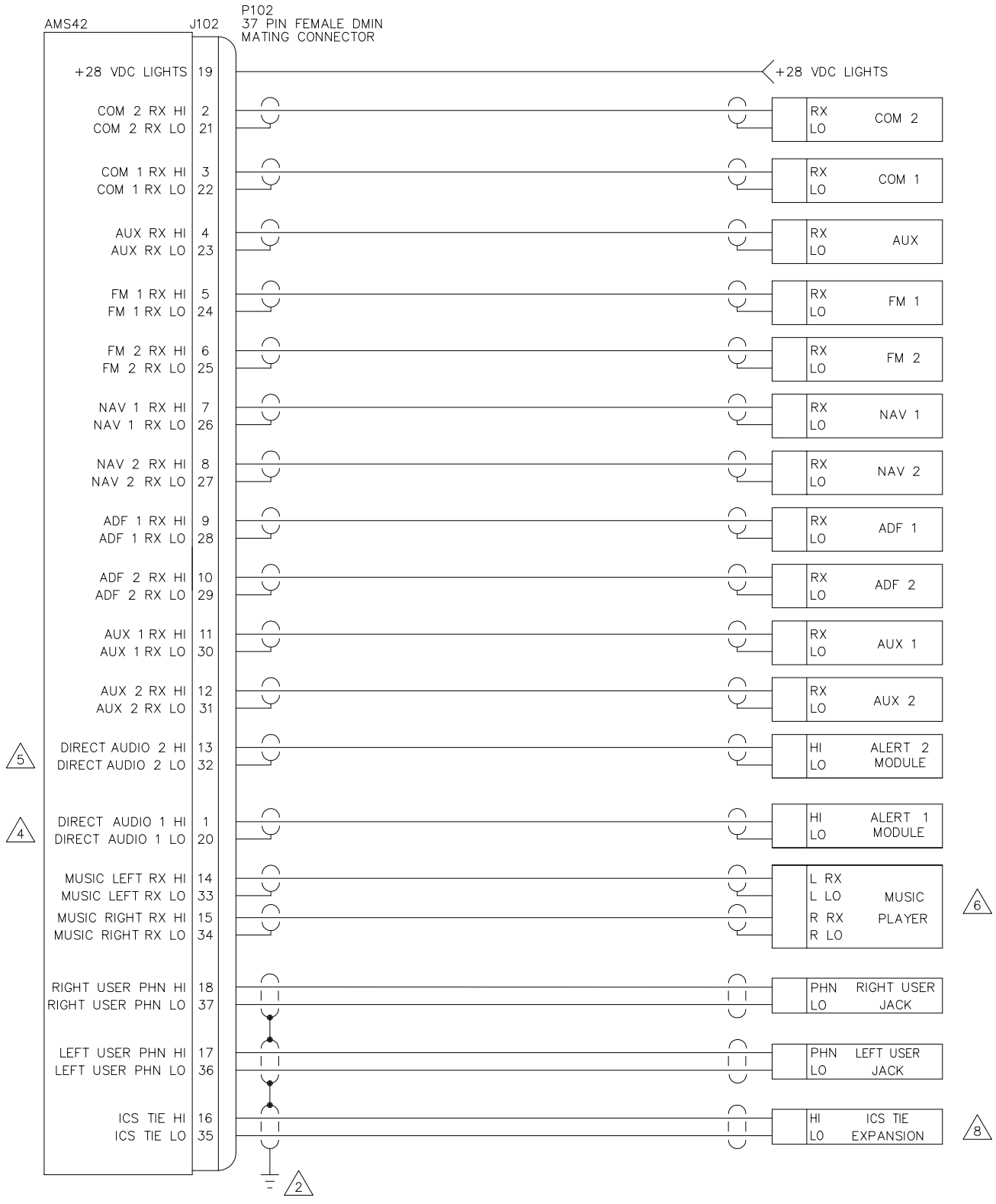
CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	SRM					
DATE	JUL 27/90	TITLE: DUAL CHANNEL AUDIO CONTROLLER				
CHECKED	NAT 208 / NAT 255					
APPROVED	NAT 114	SIZE: A	CAGE CODE: 3AB01	PART NO.: AMS42	REV.: 1.11	SHEET: 1/3
FILE: 403-0111.DWG		DWG. TYPE: INTERCONNECT		DWG. NO.: AMS42\403-0		



CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	SRM						
DATE	JUL 27/90	TITLE	DUAL CHANNEL AUDIO CONTROLLER				
CHECKED	NAT 208 / NAT 255						
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AMS42		REV. 1.11	SHEET 2/3
FILE 403-0111.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AMS42\403-1			



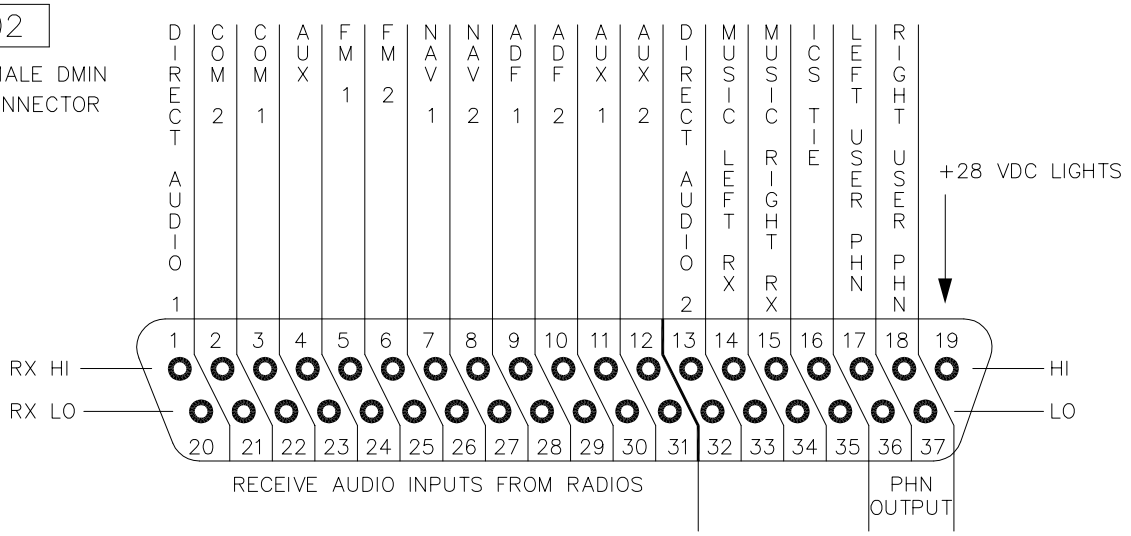
CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	SRM						
DATE	JUL 27/90	TITLE	DUAL CHANNEL AUDIO CONTROLLER				
CHECKED	NAT 208 / NAT 255						
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AMS42		REV. 1.11	SHEET 3/3
FILE 403-0111.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AMS42\403-2			

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #598 – REFER TO ECR.	MAR 18/03	TAT

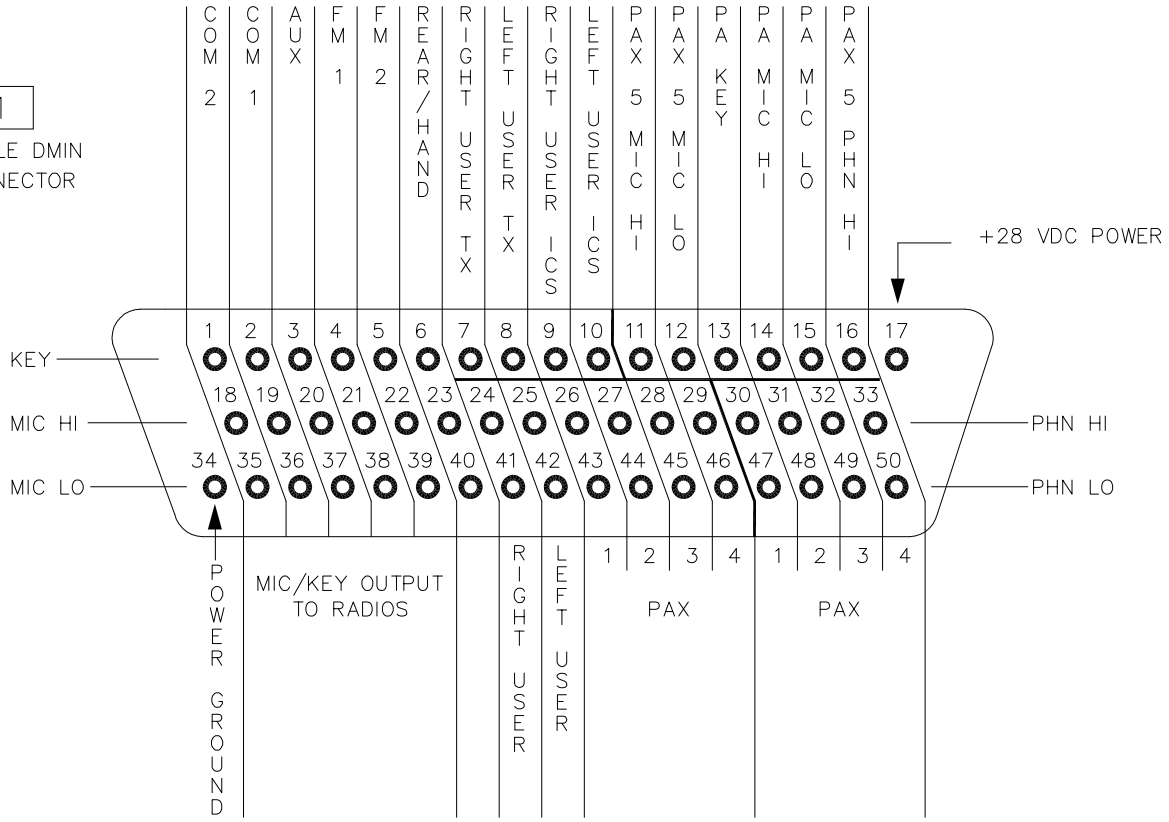
P102

37 PIN FEMALE DMIN
MATING CONNECTOR



P101

50 PIN FEMALE DMIN
MATING CONNECTOR



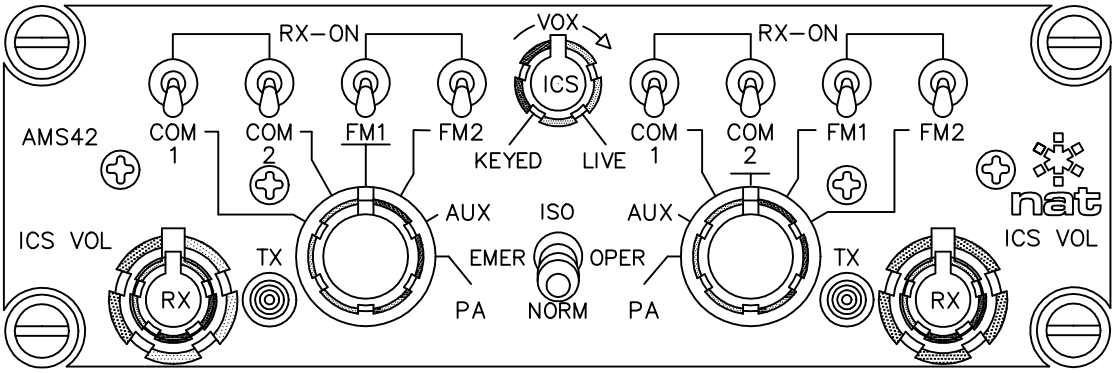
NOTE: DO NOT GROUND HEADSET COMMONS

VIEW IS FROM REAR OF AIRFRAME CONNECTOR

CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	MWS					
DATE	FEB 22/96	TITLE	DUAL CHANNEL AUDIO CONTROLLER			
CHECKED	NAT 255					
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AMS42	REV. 1.01	SHEET 1/1
FILE 405–0101.DWG		DWG. TYPE CONNECTOR MAP		DWG. NO. AMS42\405–0		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES, DRAWING CORRECTIONS	MAR 21/96	MWS



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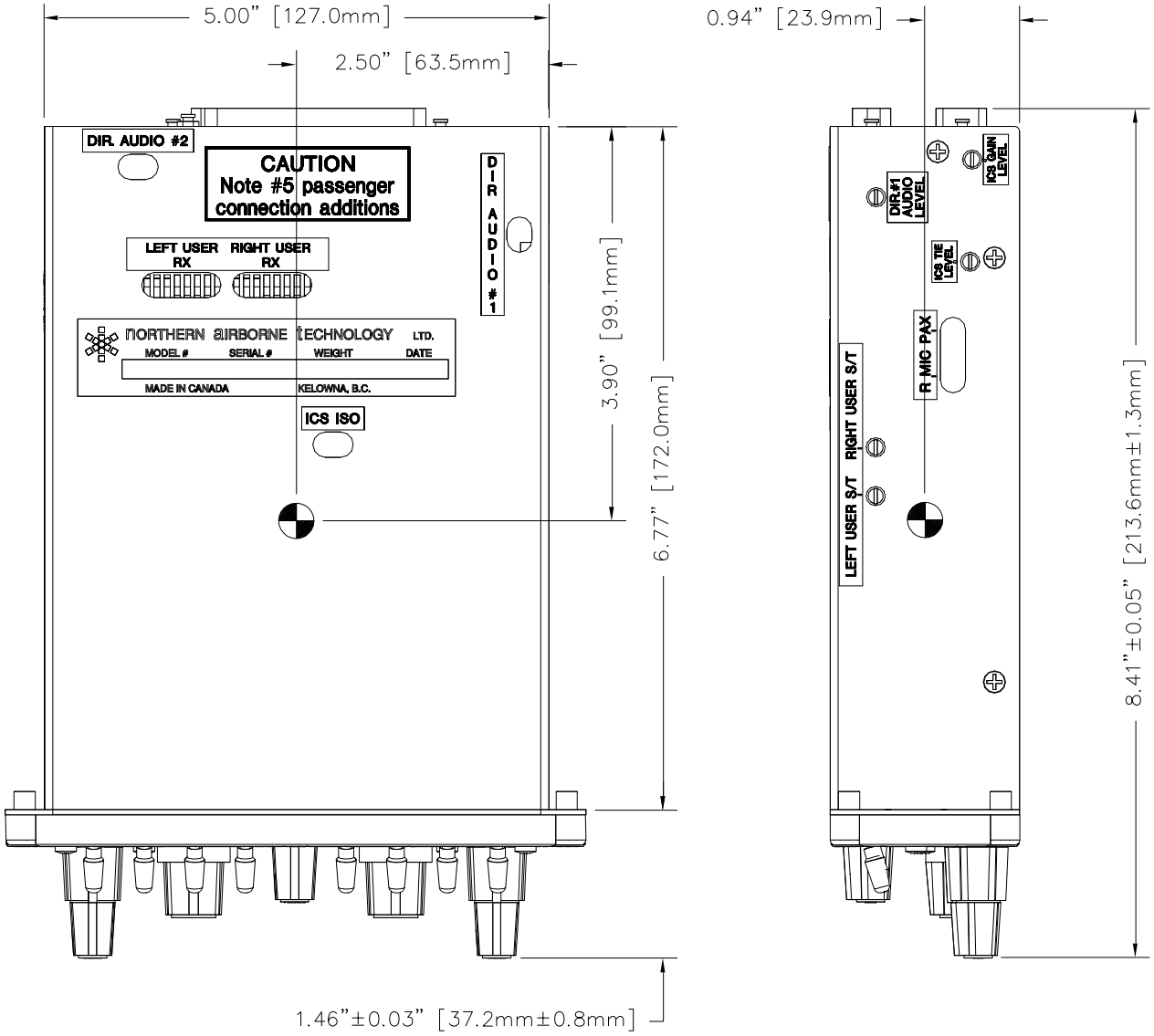
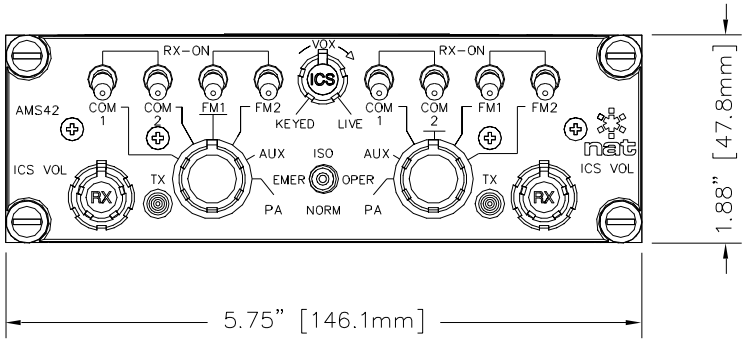
DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	MWS						
DATE	DEC 17/90	TITLE	DUAL CHANNEL AUDIO CONTROLLER				
CHECKED	NAT PROD. 105						
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AMS42		REV. 1.01	SHEET 1/2
FILE 905-0101.DWG		DWG. TYPE FACEPLATE		DWG. NO. AMS42\905-0			





WEIGHT: 2.30 Lbs. [1.0 kg]

CENTER OF GRAVITY

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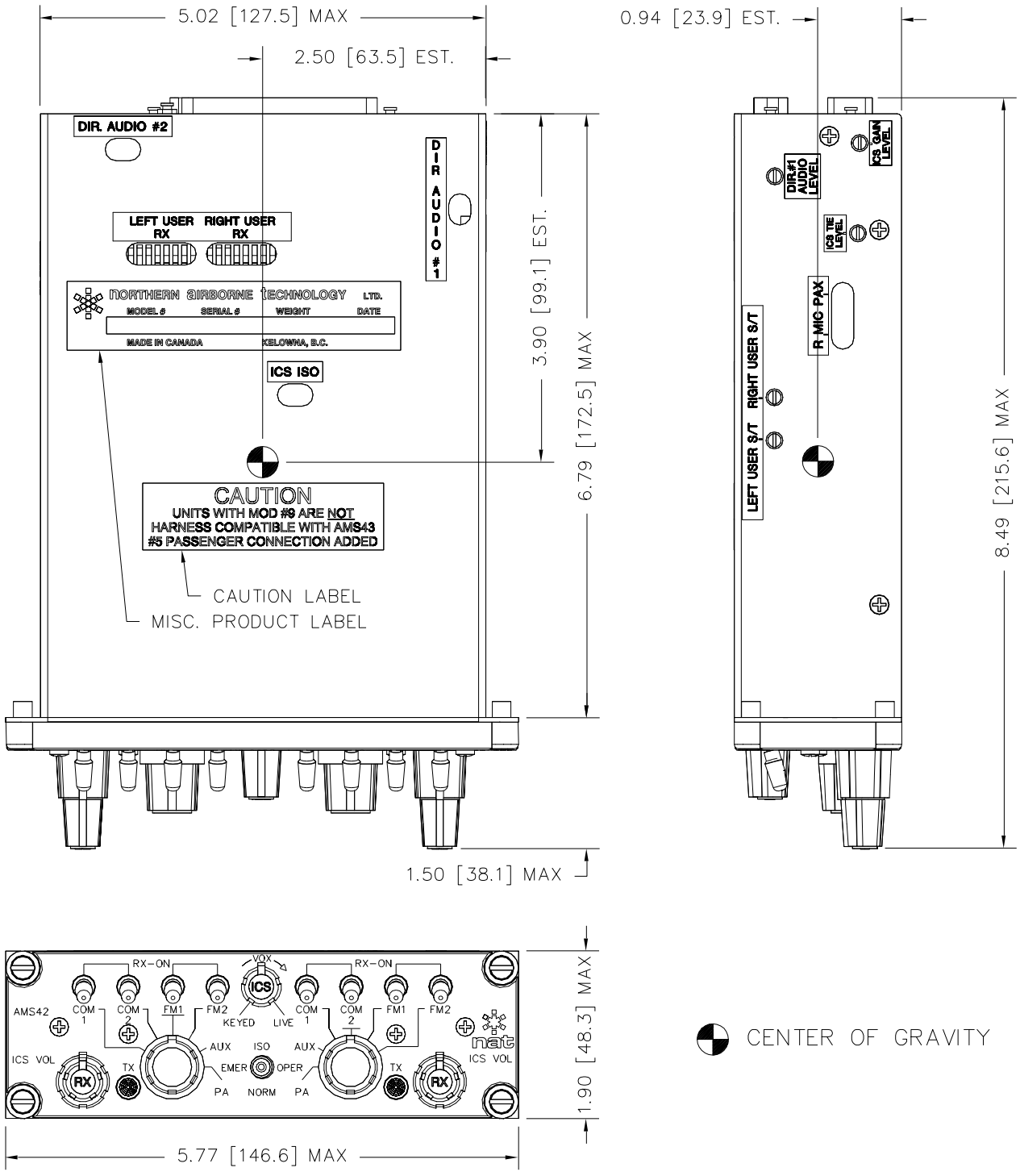
TOLERANCES UNLESS STATED OTHERWISE 0.X=+/−0.030 0.XX=+/−0.010 0.XXX=+/−0.005 0.XXXX=+/−0.002 ANGLE=+/− 0.5 DEG.	DIMENSIONS IN INCHES THIRD ANGLE PROJECTION	DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.			
		DRAWN	TGM				
		DATE	MAR 2/99	TITLE	DUAL CHANNEL AUDIO CONTROLLER		
		CHECKED	NAT 200 NAT 214				
MATERIAL		APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AMS42	REV. 1.00 / SHEET 1/1
FINISH		FILE 922−0100.DWG		DWG. TYPE MECH. INSTALLATION		DWG. NO. AMS42\922−0	

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.10	DOCCR00934 – CHANGED CAUTION LABEL, UPDATED FORMAT.	SEP 14/04	TAT



NOTES:
1. DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M–1994

CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DIMENSIONS ARE INCHES [mm]	DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.
THIRD ANGLE PROJECTION	DRAWN	TGM	
	DATE	MAR 2/99	TITLE: DUAL CHANNEL AUDIO CONTROLLER
MASS: 2.42 lbs. (1.10 Kg) MAX	CHECKED	NAT 249	
MATERIAL: –	APPROVED	NAT 501	SIZE A / CAGE CODE 3AB01 / PART NO. AMS42 / REV. 1.10 / SHEET 1/1
FINISH: CHROMATE CONVERSION	FILE	922–0.DWG	DWG. TYPE MECH. INSTALLATION / DWG. NO. AMS42\922–0

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	DEC 12/95	TGM
1.02	ECR #1686 – SWAPPED NOTES 4 AND 5.	JUN 12/00	TAT
1.03	ECR #598 – REFER TO ECR.	OCT 24/00	TAT

AMS44 INSTALLATION NOTES

NOTES:

1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE NOTED. USE TEFZEL M27500 OR SPEC44 (M81044) SHIELDED WIRE WITH SOLDER SLEEVES.

2. HEADSET, MICROPHONE AND ICS TIE LINES USE TWISTED SHIELDED PAIR. CONNECT SHIELDS TOGETHER AND GROUND TO CLEAN AIRCRAFT GROUND. GROUND POINT SHOULD BE THE SAME AS AIRCRAFT AUDIO SYSTEM POWER GROUND.

3. DO NOT GROUND MICROPHONE OR HEADSET LO CONNECTIONS TO AIRFRAME.

4. ADJUSTABLE LEVEL DIRECT AUDIO INPUT, AMPLIFIED.

5. FIXED LEVEL DIRECT AUDIO INPUT. NO ADJUSTMENT. DO NOT PARALLEL FROM SINGLE SOURCE AUDIO TO OTHER AUDIO CONTROL PANELS.

6. AIRCRAFT ENTERTAINMENT SYSTEM (MUSIC) MUST BE GROUND REFERENCED. IF NOT, A FLOATING GROUND ADAPTER BETWEEN THE AUDIO CONTROLLER AND ENTERTAINMENT SYSTEM WILL BE REQUIRED.

7. FOR MOD 9 UNITS ONLY. THESE ARE N/C FOR ALL OTHER UNITS.

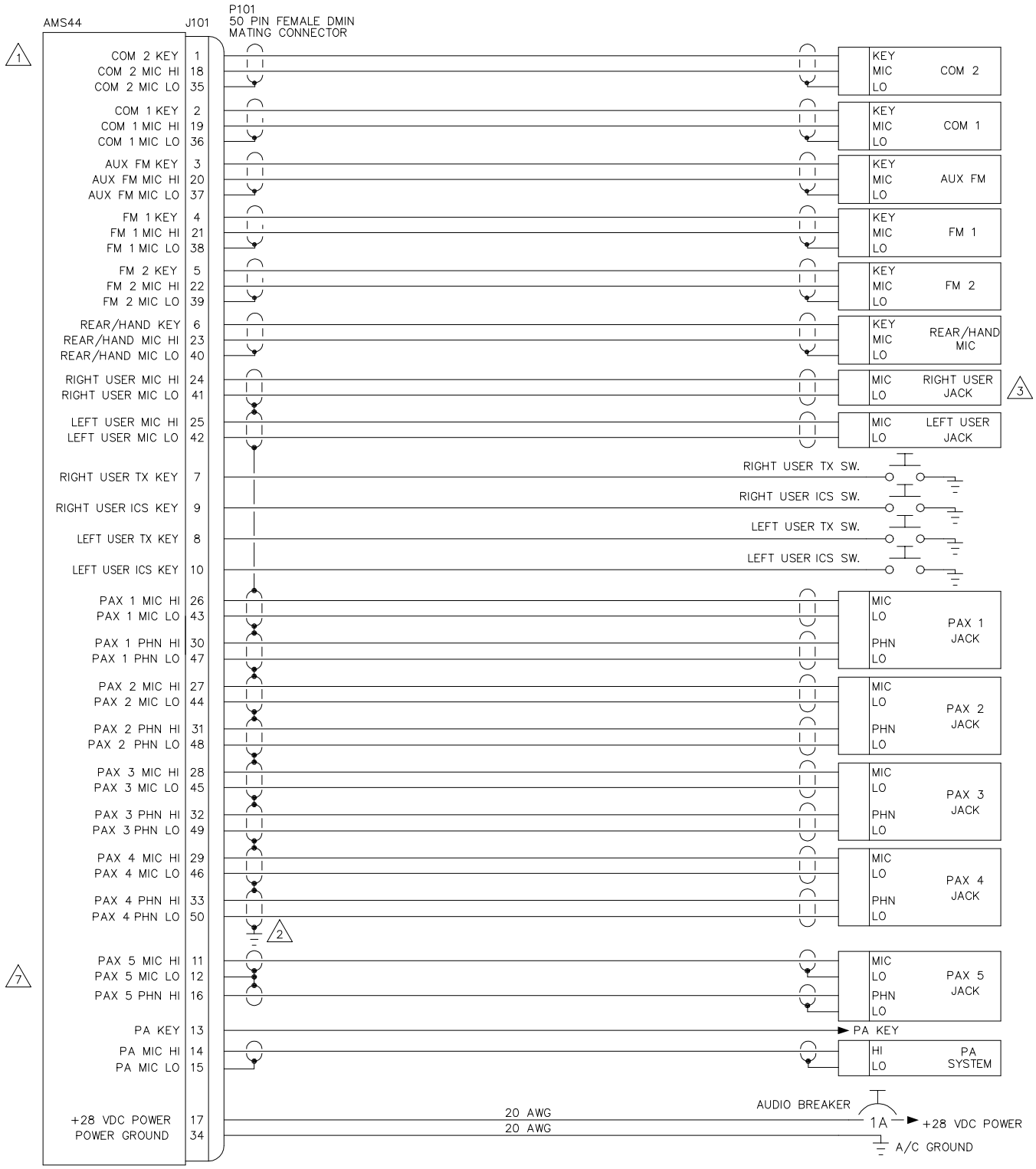
8. TO BE USED FOR EXPANSION OF INTERCOM SYSTEM ONLY. REFER TO INSTALLATION MANUAL FOR DETAILS.

DEFINITIONS:

N/C:	NO CONNECTION. THE PIN IS NOT CONNECTED TO ANYTHING INTERNALLY, AND THEREFORE SHALL HAVE NO CONNECTION EXTERNALLY.
N/C SPARE:	NO CONNECTION INTERNALLY, BUT A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.
RESERVED:	MAY BE CONNECTED AND USED IN THE FUTURE. THE CIRCUITRY MAY BE PRESENT OR ADDED TO ACTIVATE THE FUNCTION. THE PIN MAY BE USED FOR TEST PURPOSES. THERE IS NO EXTERNAL CONNECTION.
RESERVED SPARE: (RSV SP)	RESERVED, BUT INSTRUCTIONS SHALL BE FOLLOWED TO ACTIVATE THE CIRCUITRY. A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

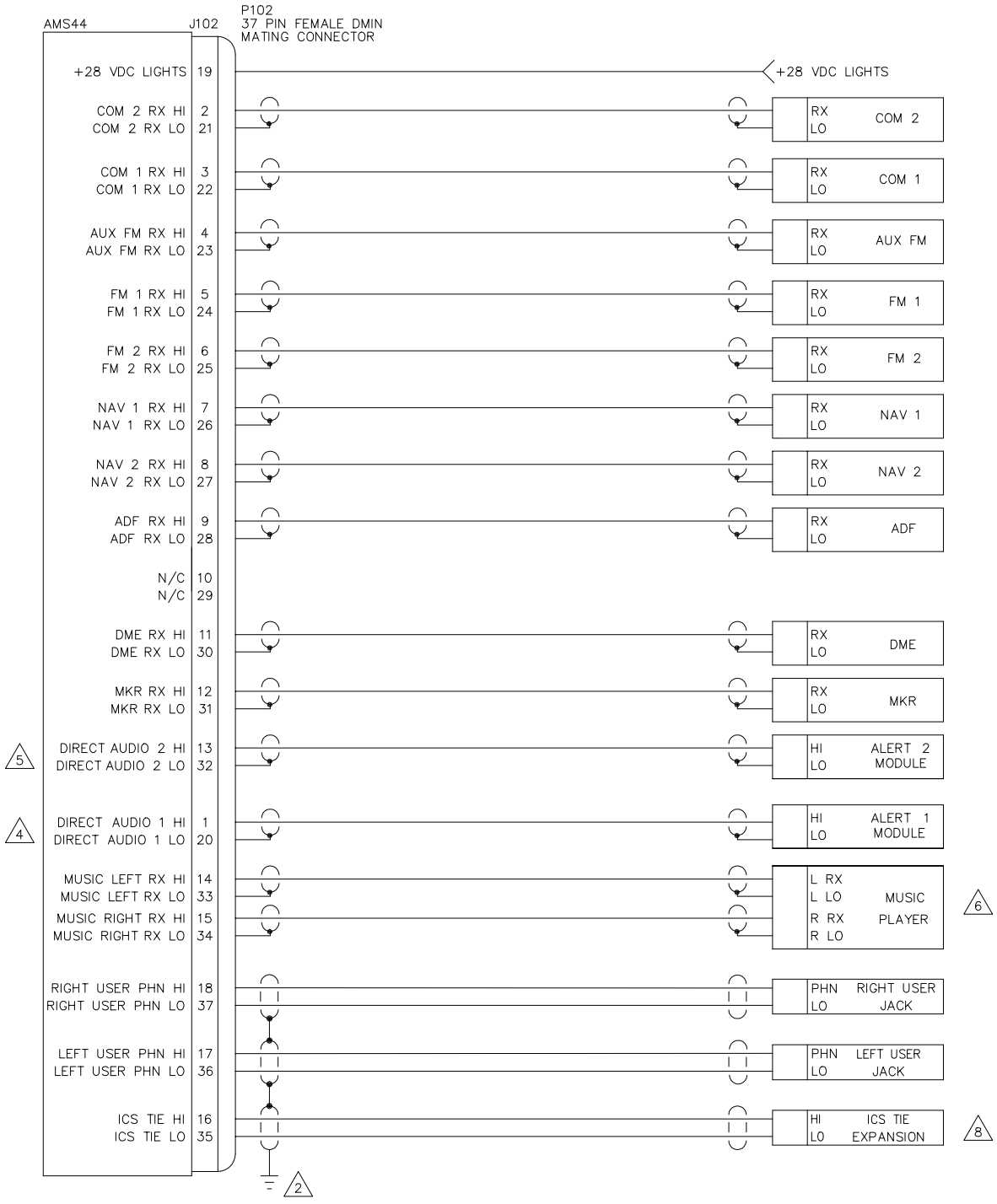
PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	KV	NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KV					
DATE	MAY 3/89	TITLE: DUAL CHANNEL AUDIO CONTROLLER				
CHECKED	NAT PROD. 223 105					
APPROVED	NAT 114	SIZE: A	CAGE CODE: 3AB01	PART NO.: AMS44	REV.: 1.03	SHEET: 1/3
FILE: 403-0103.DWG		DWG. TYPE: INTERCONNECT		DWG. NO.: AMS44\403-0		


AMS44
J101
P101
50 PIN FEMALE DMIN
MATING CONNECTOR
COM 2 KEY 1
COM 2 MIC HI 18
COM 2 MIC LO 35
COM 1 KEY 2
COM 1 MIC HI 19
COM 1 MIC LO 36
AUX FM KEY 3
AUX FM MIC HI 20
AUX FM MIC LO 37
FM 1 KEY 4
FM 1 MIC HI 21
FM 1 MIC LO 38
FM 2 KEY 5
FM 2 MIC HI 22
FM 2 MIC LO 39
REAR/HAND KEY 6
REAR/HAND MIC HI 23
REAR/HAND MIC LO 40
RIGHT USER MIC HI 24
RIGHT USER MIC LO 41
LEFT USER MIC HI 25
LEFT USER MIC LO 42
RIGHT USER TX KEY 7
RIGHT USER ICS KEY 9
LEFT USER TX KEY 8
LEFT USER ICS KEY 10
PAX 1 MIC HI 26
PAX 1 MIC LO 43
PAX 1 PHN HI 30
PAX 1 PHN LO 47
PAX 2 MIC HI 27
PAX 2 MIC LO 44
PAX 2 PHN HI 31
PAX 2 PHN LO 48
PAX 3 MIC HI 28
PAX 3 MIC LO 45
PAX 3 PHN HI 32
PAX 3 PHN LO 49
PAX 4 MIC HI 29
PAX 4 MIC LO 46
PAX 4 PHN HI 33
PAX 4 PHN LO 50
PAX 5 MIC HI 11
PAX 5 MIC LO 12
PAX 5 PHN HI 16
PA KEY 13
PA MIC HI 14
PA MIC LO 15
+28 VDC POWER 17
POWER GROUND 34
KEY MIC LO COM 2
KEY MIC LO COM 1
KEY MIC LO AUX FM
KEY MIC LO FM 1
KEY MIC LO FM 2
KEY MIC LO REAR/HAND MIC
MIC LO RIGHT USER JACK
MIC LO LEFT USER JACK
RIGHT USER TX SW.
RIGHT USER ICS SW.
LEFT USER TX SW.
LEFT USER ICS SW.
MIC LO PHN LO PAX 1 JACK
MIC LO PHN LO PAX 2 JACK
MIC LO PHN LO PAX 3 JACK
MIC LO PHN LO PAX 4 JACK
MIC LO PHN LO PAX 5 JACK
PA KEY
HI LO PA SYSTEM
AUDIO BREAKER
1A
+28 VDC POWER
A/C GROUND
20 AWG
20 AWG
1
2
3
7

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	KV						
DATE	MAY 16/89	TITLE					
CHECKED	NAT PROD. 223 105	DUAL CHANNEL AUDIO CONTROLLER					
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AMS44		REV. 1.03	SHEET 2/3
FILE 403-0103.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AMS44\403-1			



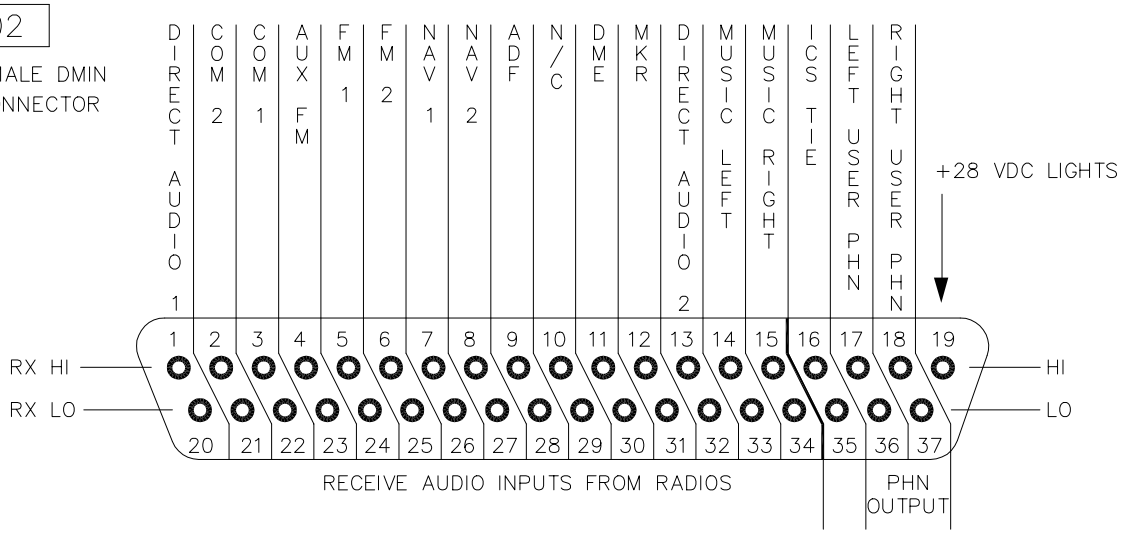
PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	KV						
DATE	MAY 3/89	TITLE	DUAL CHANNEL AUDIO CONTROLLER				
CHECKED	NAT PROD. 223 105						
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AMS44		REV. 1.03	SHEET 3/3
FILE 403-0103.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AMS44\403-2			

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	DEC 7/95	TGM
1.02	ECR #598 – REFER TO ECR.	SEP 18/00	TAT

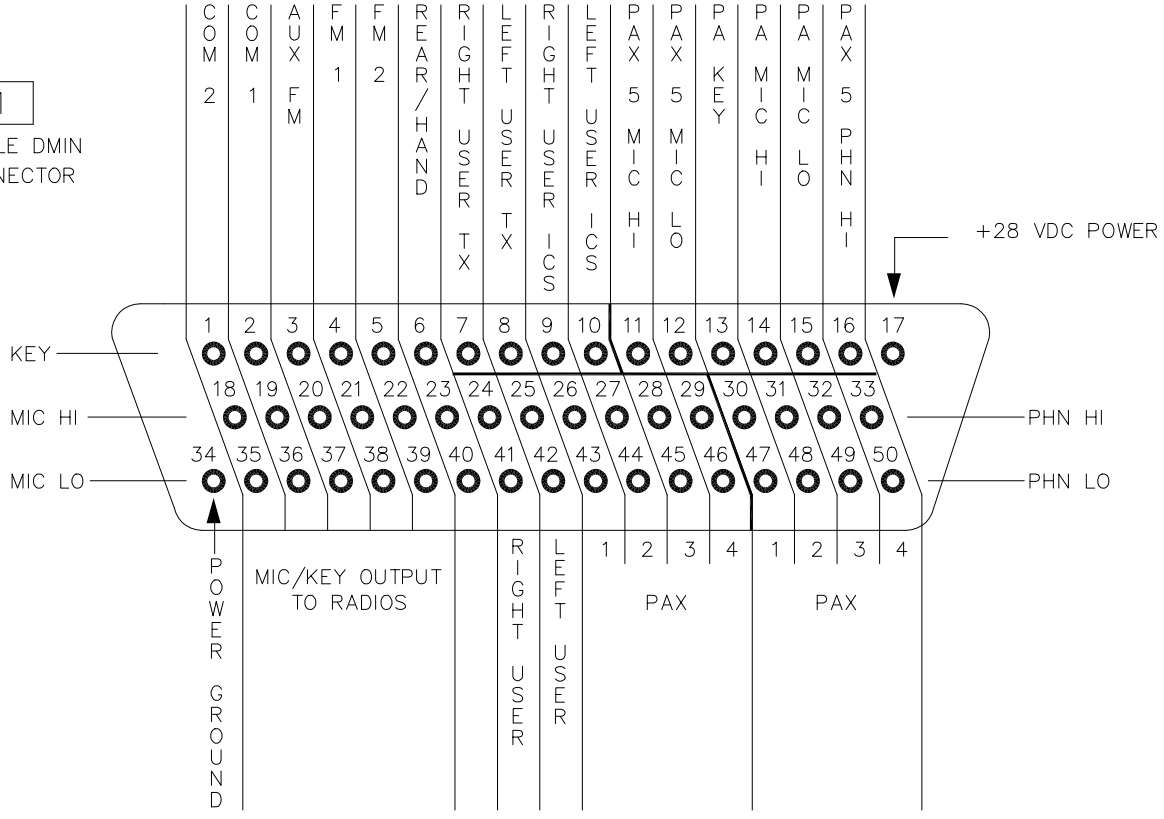
P102

37 PIN FEMALE DMIN MATING CONNECTOR



P101

50 PIN FEMALE DMIN MATING CONNECTOR



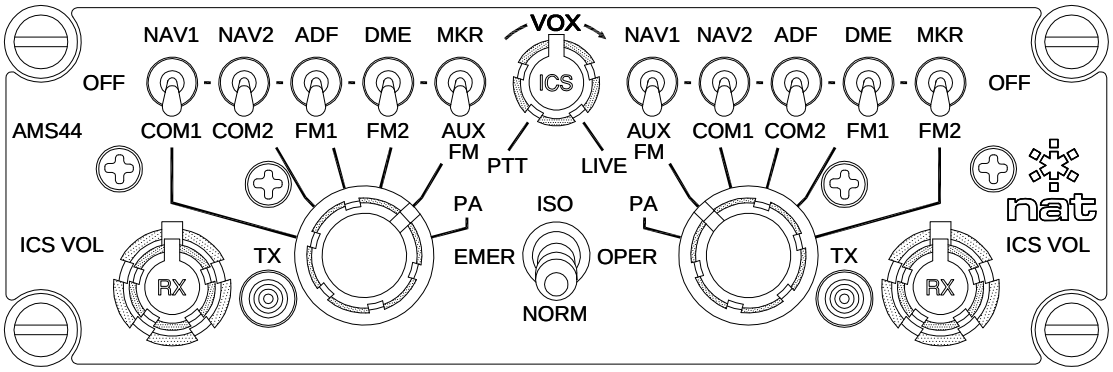
NOTE: DO NOT GROUND HEADSET COMMONS

VIEW IS FROM REAR OF AIRFRAME CONNECTOR

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KV					
DATE	MAY 16/90	TITLE	DUAL CHANNEL AUDIO CONTROLLER			
CHECKED	NAT 223 NAT PROD. 105					
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AMS44	REV. 1.02	SHEET 1/1
FILE	405-0102.DWG	DWG. TYPE	CONNECTOR MAP	DWG. NO.	AMS44\405-0	

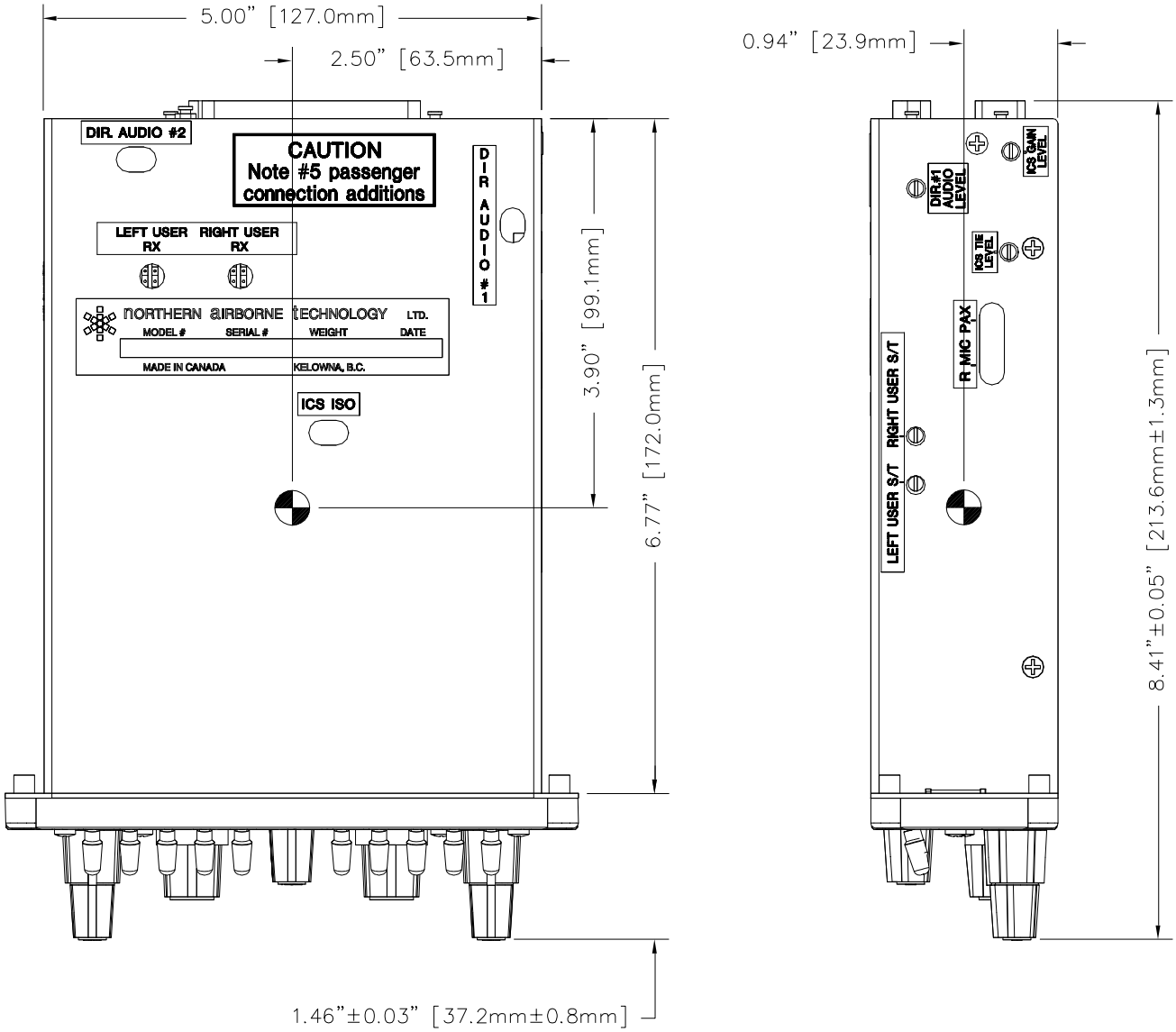
REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	DEC 7/95	TGM
1.02	ENGRAVE LAYER ADDED	MAY 1/96	TGM
1.03	ECR002373 – AMS44 TEXT ALIGNED WITH SWITCH LEGENDS, FORMAT CHANGES.	APR 27/06	TAT

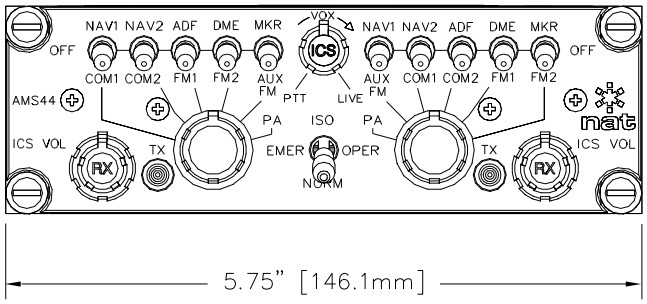


CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TB					
DATE	JUN 2/93	TITLE	DUAL CHANNEL AUDIO CONTROLLER FRONT VIEW			
CHECKED	NAT 255					
APPROVED	NAT 134	SIZE A	CAGE CODE 3AB01	PART NO. AMS44	REV. 1.03	SHEET 1/3
FILE	905–0.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AMS44\905–0	

ENG–FORM: \905's\AA94–xxx.905–0110.DWT





1.88" [47.8mm]

5.75" [146.1mm]

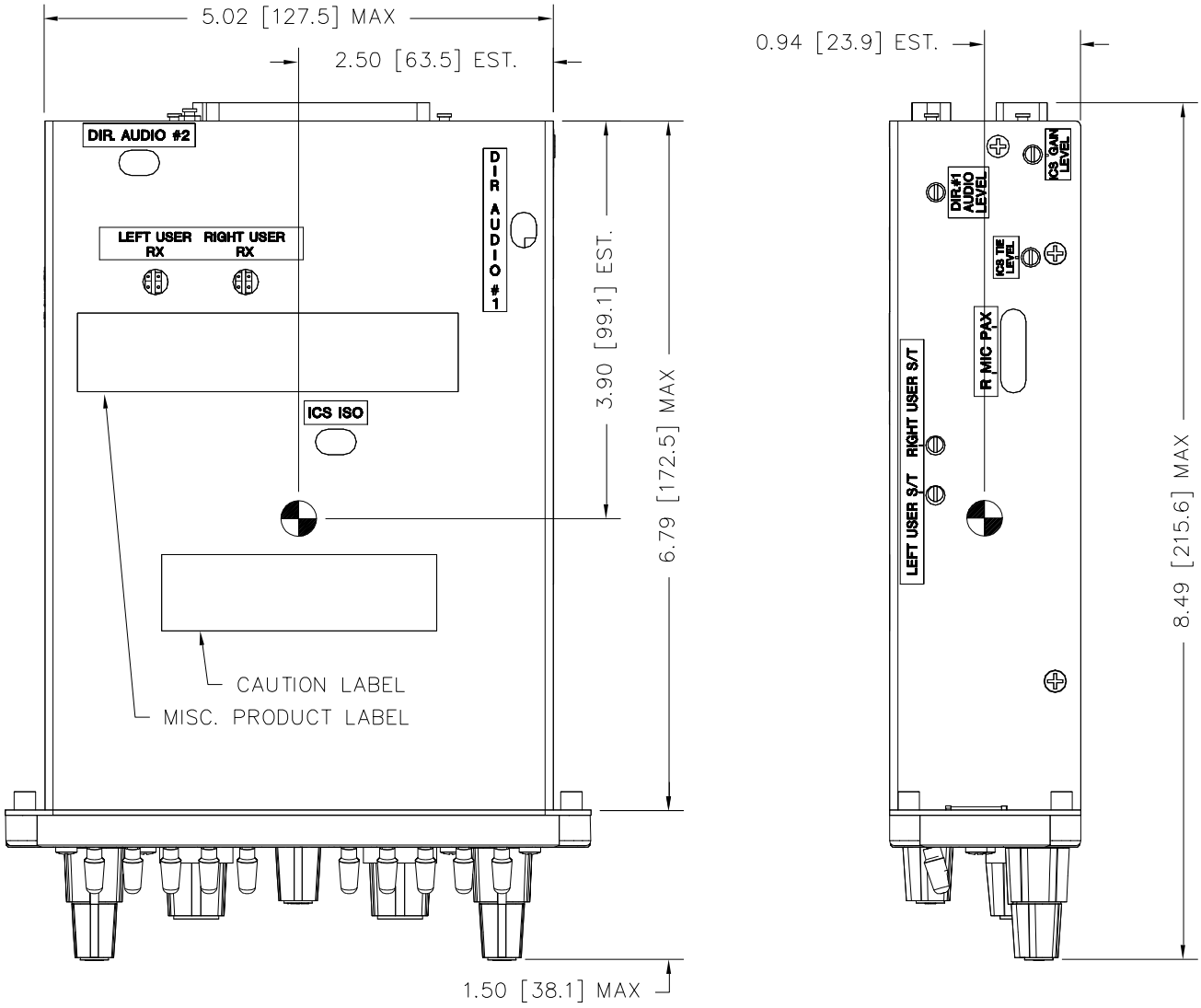
WEIGHT: 2.66 Lbs [1.2 kg]

CENTER OF GRAVITY

Confidential and Proprietary to NAT

TOLERANCES UNLESS STATED OTHERWISE 0.X=+/−0.030 0.XX=+/−0.010 0.XXX=+/−0.005 0.XXXX=+/−0.002 ANGLE=+/− 0.5 DEG.	DIMENSIONS IN INCHES THIRD ANGLE PROJECTION	DESIGNED: KV DRAWN: TGM DATE: MAR 2/99 CHECKED: NAT 200, NAT 214	NORTHERN AIRBORNE TECHNOLOGY LTD. TITLE: DUAL CHANNEL AUDIO CONTROLLER
MATERIAL		APPROVED: NAT 107	SIZE: A; CAGE CODE: 3AB01; PART NO.: AMS44; REV.: 1.00; SHEET: 1/1
FINISH		FILE: 922−0100.DWG	DWG. TYPE: MECH. INSTALLATION; DWG. NO.: AMS44\922−0

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.10	DOCCR00934 – CHANGED CAUTION LABEL, UPDATED FORMAT.	SEP 14/04	TAT



NOTES:
1. DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M–1994

CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DIMENSIONS ARE INCHES [mm]	DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
THIRD ANGLE PROJECTION	DRAWN	TGM					
	DATE	MAR 2/99	TITLE	DUAL CHANNEL AUDIO CONTROLLER			
MASS: 2.79 lbs. (1.27 Kg) MAX	CHECKED	NAT 249					
MATERIAL: –	APPROVED	NAT 501	SIZE A	CAGE CODE 3AB01	PART NO. AMS44	REV. 1.10	SHEET 1/1
FINISH: CHROMATE CONVERSION	FILE	922–0.DWG	DWG. TYPE	MECH. INSTALLATION	DWG. NO.	AMS44\922–0	

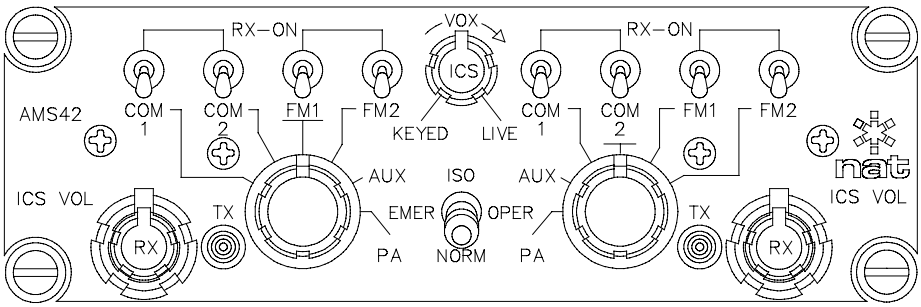
Section 3.0 Operation

This section is divided to provide model-specific Operational instructions.

Operation Instructions for the **AMS42** can be found in **Sections 3.1 to 3.6.**

Operation Instructions for the **AMS44** can be found in **Sections 3.7 to 3.12**.

3.1 AMS42 - General Operation



The AMS42 provides one central controller for all the aircraft audio, allowing selection of transmit and receive audio, LIVE, KEYED, or VOX intercom, interface for an additional handheld transmit microphone (hand mic), and pilot/copilot isolation/emergency operation. Typical definition of the unit has the 'pilot' on the right side of the controller, and the 'copilot' and passengers on the left side. This can be easily re-configured at the time of installation for alternate seating arrangements.

Individual control over receive and transmit functions is provided for both the pilot and copilot (observer), and a common control is provided for LIVE, KEYED and VOX ICS operation. An additional control is provided for NORMAL, EMERGENCY, or ISOLATE (pilot cut off from ICS audio) operation.

Sidetone (S/T) level is adjustable internally, and Receive (RX) and Intercom (ICS) levels are adjustable on the front panel. All audio, except the S/T of the radio in use and any Type 'B' DIRECT AUDIO input signals, are muted during transmit for clarity. ICS operation allows transmit during any ICS mode by using the PTT switch.

3.2 AMS42 - Audio Alerting Functions

No internal audio alerting is provided in the AMS42. Two direct (unswitched) inputs are provided to allow airframe alerting signals to be routed to the pilot. See Section 3.4.5 (Auxiliary Inputs) for more information.

DIR AUD #1 is amplified by the Audio controller, and can not be heard when the Mode Switch is in the EMER position. DIR AUD #2 is not amplified, and is audible at all times.

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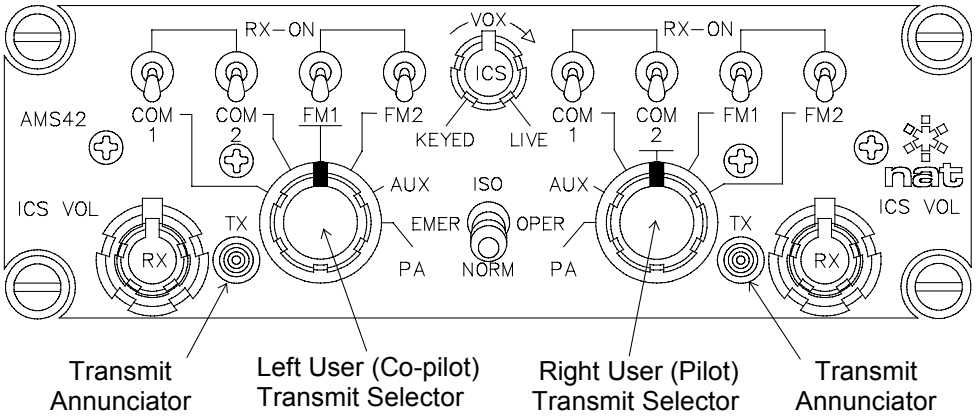
3.3 AMS42 - Selection of Transmit Functions



3.3.1 Transmit Selectors

The transmit selector controls are six position rotary switches, one on each side of the panel to correspond to the user on that side of the aircraft. The controls select the transmit function required by the relevant user. Each rotary selector switch is completely independent of the other, and the pilot and copilot have equal priority during transmit. When the PTT is activated, all audio selected on the side of the controller that is transmitting is muted, except the sidetone of the transceiver in use.

3.3.1.1 Automatic Receive Audio

Receive audio is automatically selected as a function of the respective rotary selector switch. No additional switching is needed to establish external communication.

3.3.1.2 Transmit Annunciators

During transmit from either the pilot or copilot position, the appropriate TX annunciator (green) will light on the front panel.

3.3.1.3 TX Selector Example

In the figure above, the positions of the rotary selector switches indicate that the right side of the controller is set for transmit and receive operation on the COM2 transceiver while the left side of the controller is set for transmit and receive operation on the FM1 transceiver.

3.3.2 Hand Microphone

The hand mic functions without power and will work in emergency or equipment failure situations. The hand mic normally functions on the left side of the controller but can be connected to the right side at the time of installation by changing an internal switch. When the hand mic or transmit PTT switch is activated, the mic involved will be coupled to the radio (or PA) selected. The TX annunciator will not light when the hand mic is used.

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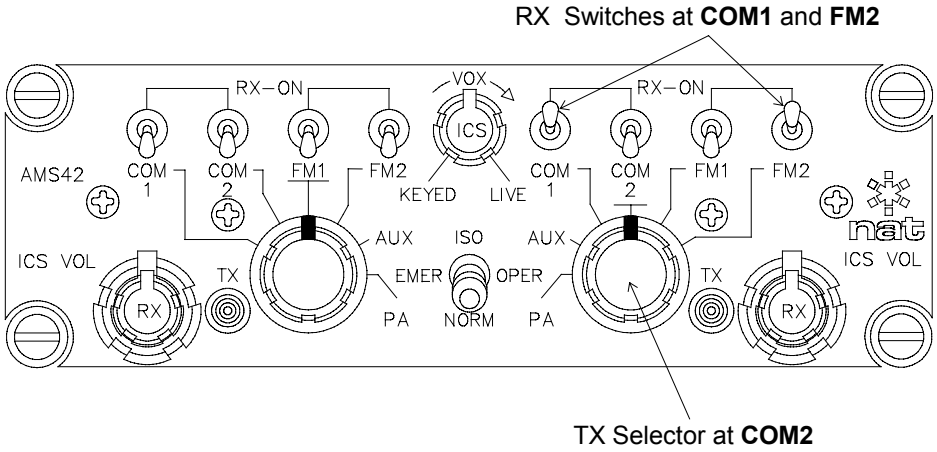
3.4 AMS42 - Transceiver Receive Functions

3.4.1 Receive Selection Switches

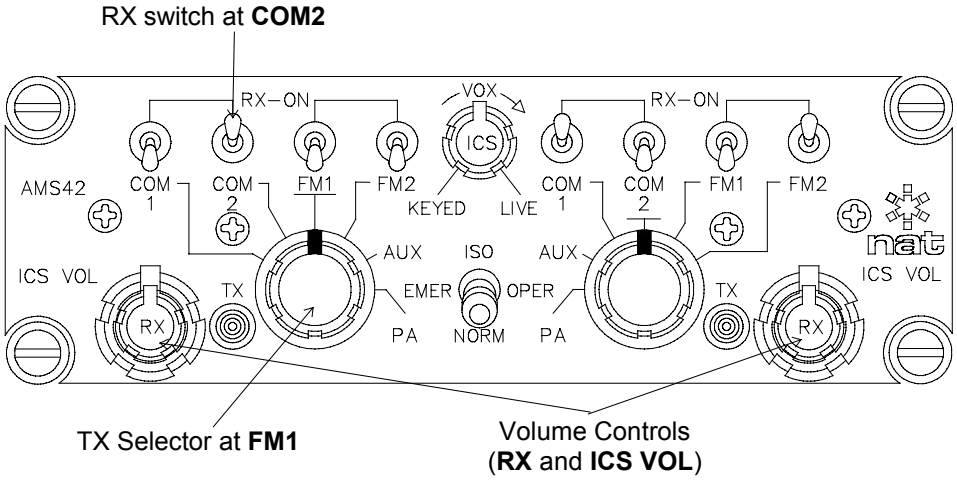
The receive audio is selected by switching any of the RX switches (white switch bats) UP to connect the indicated radio to the headphone bus. The **AUX** position does not have a separate RX switch and is connected to the headphone bus by rotating the TX selector to the **AUX** position. See section 3.4.3.1 for RX volume control.

3.4.2 Transceiver Selection Examples

In the figure below, the right side TX selector is set for transmit and receive operation on **COM2**. The Receive function switches are also selected so the right side can monitor **COM1** and **FM2** transceivers. Note that **FM1** is not selected and **AUX** cannot be selected by the RX switches.



In the figure below, the right side configuration remains the same. The left side is set up to receive and transmit on **FM1** while monitoring the **COM2** transceiver. Note that **COM1** and **FM2** are not selected on the left side.



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3.4.3 Volume Controls

The controller features individual master **RX** and **ICS VOL** controls on both the left and right sides of the unit, which can be adjusted to suit the specific user's requirements.

3.4.3.1 RX Volume Control

The **RX** knobs are the smaller, topmost controls of the dual concentric volume control assemblies. The **RX VOL** controls provide adjustment of the RX audio selected by the controller. As in any audio system, it is important to set the individual radio volume controls to a nominal level that is acceptable to both pilots, *then* adjust the respective master **RX VOL** on the audio controller to suit user preference. The RX VOL controls are designd to provide a minimum level, even when set fully ccw.

All receive audio is muted during transmit (**NORM** and **ISO** mode).

3.4.3.2 ICS Volume Control

The **ICS VOL** knobs are the larger, bottom controls of the dual concentric volume control assemblies. The **ICS VOL** controls provide adjustment of the ICS audio selected by the controller. The ICS volume controls provide adjustment from 0 to full output. See also section 3.5.

3.4.4 Passenger Receive Audio Selection

The passengers normally hear the radio audio as selected on the left side of the controller. The passengers can be shifted to the right side by changing the setting of the internal **PAX** switch, accessible through the right side of the controller. The passengers will not hear any radio audio when the red mode switch is in the **EMER** position.

3.4.5 Auxiliary Inputs

Two Direct Audio inputs are available. They are coupled directly to either the left or right side of the controller at the time of installation. The Direct Audio inputs are normally selected for the right side of the controller when the unit is shipped from the factory.

3.5 AMS42 - Intercom Functions

All ICS audio is controlled by the front panel ICS volume controls and may be varied to suit conditions. There are independent volume controls for the left and right sides of the controller. The **ICS VOL** are the larger, aft controls of the dual concentric volume control assemblies. See section 3.4.3.2.

If the controller is operated in the emergency mode, ICS operation will continue (if there is no fault condition) between the passengers, but not between the pilot and copilot or passengers.

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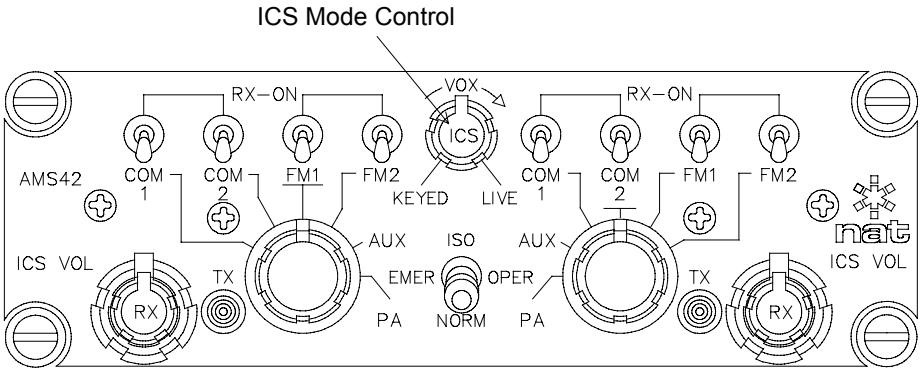
3.5.1 ICS Modes of Operation

Intercom system (ICS) audio may be implemented in three modes between users; **LIVE** (on constantly), **VOX** (voice activated), or **KEYED** (active only when switched by ICS PTT switch). The ICS mode is selected by the **ICS** Mode control (see below). It is common to use the **LIVE** mode during ground operations, start-up, etc., and to use **VOX** or **KEYED** operation if conditions are so noisy that 'pilot fatigue' will result.



ICS mode selection is made by positioning the ICS Mode control for the desired operation.

KEYED ICS (PTT Operation)*****

ICS Mode Control set fully counter-clockwise into the switch detent.

LIVE (Hot Mic Operation)

ICS Mode Control set fully clockwise.

VOX (Voice Activated)

ICS Mode Control set fully clockwise, then slowly rotated counter-clockwise until the intercom just becomes 'quiet'. This setting will vary with ambient noise conditions, and the quality and number of microphones connected in the system.

***** KEYED operation is inherent to the pilot and copilot microphone circuits only.

3.5.2 Passenger ICS Operation

Passenger ICS audio is LIVE when the controller is in the **LIVE** or **KEYED** mode of ICS operation and are VOX triggered when a VOX setting is selected. *Note that the passengers are always LIVE unless interrupted by an in-line PTT cord, or the controller is set for **VOX** operation.*

Passenger and copilot (observer) operations can be maximized by using PTT type cord assemblies designed for use with NAT audio controllers.

CAUTION: Ensure that all PTT type cord assemblies have properly shielded mic and phone wiring, or 'crosstalk' will occur.

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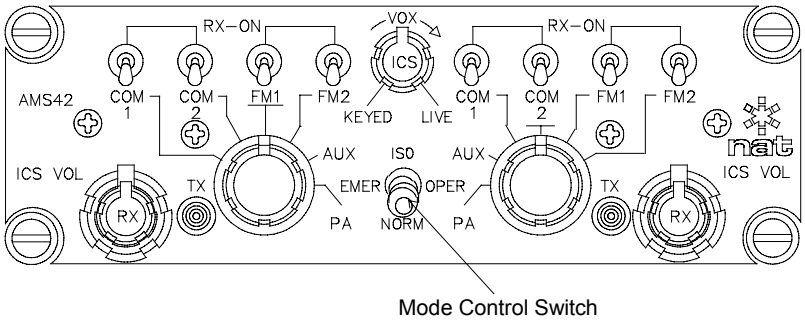
3.6 AMS42 Mode Control

The Mode Control switch is a three-position, locking toggle switch that is used to select between **ISO, EMER OPER**, and **NORM.** It is identified with a red cap.



3.6.1 Emergency Operation

The center (**EMER OPER**) position of the mode switch places the controller into the emergency operation mode. When switched to the **EMER OPER** position, both pilot and copilot controls are removed from the ICS bus and connected directly to their respective radios. This mode should be selected in the event of a box fault or power failure.

The Emergency function should be tested prior to flight to assure proper operation and allow the radio levels to be set adequately for emergency operation.

3.6.1.1 Emergency Mode Effects

In the **EMER** mode, all functions are retained by the pilot and copilot, except ICS and possibly boom mic operation. If the box or airframe fault prevents the TX annunciator from lighting during transmit (indicating a failure in the mic keying circuit), then the hand mic should be used. A power fault of any kind will prevent the TX annunciator from lighting, giving an immediate indication of failure. If ICS audio is still available, then the power to the controller has not failed and loss of the TX light indicates TX switch failure.

Note that in the **EMER** mode, all switches work exactly as they do during **NORM** operation, except for the RX and ICS volume controls which will have no effect. Any selected receive audio is switched to the appropriate user in the 'emergency' mode (red mode switch in the **EMER** position), but not to any passengers in the system. Level will be lower than **NORM** operation because the signals are obtained directly from the radios, bypassing the electronics in the controller. This is provided for failure situations which make operation impossible in the **NORM** mode (i.e., loss of power or amplifier failure, etc.)

3.6.2 Isolation Operation

The mode switch can select an **ISO** function, which prevents the selected user from receiving ICS audio. This is useful when passengers are interfering with critical flight operations (landing, etc.). It can be preselected at installation to isolate the left or right side. Intercom operation for the passengers and copilot is not affected. It is normally set for isolation of the right side when the unit is shipped from the factory.

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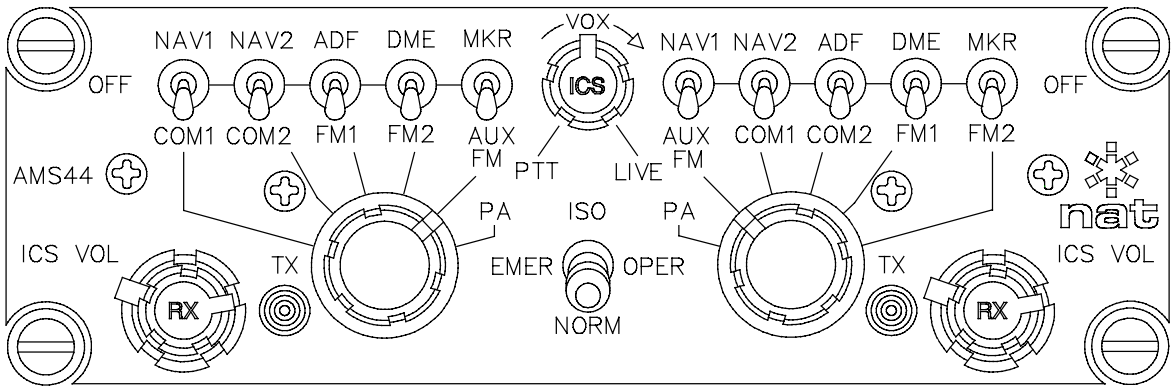
3.7 AMS44 - General Operation



The AMS44 provides one central controller for all the aircraft audio, allowing selection of transmit and receive audio, LIVE, PTT (Keyed), or VOX intercom, interface for an additional handheld transmit microphone (hand mic), and pilot/copilot isolation/ emergency operation. Typical definition of the unit has the 'pilot' on the right side of the controller, and the 'copilot' and passengers on the left side. This can be easily re-configured at the time of installation for alternate seating arrangements.

Individual control over receive and transmit functions are provided for both the pilot and copilot (observer), and a common control is provided for LIVE, PTT and VOX ICS operation. An additional control is provided for NORMAL, EMERGENCY, or ISOLATE (pilot cut off from ICS audio) operation.

Sidetone (S/T) level is adjustable internally, and Receive (RX) and Intercom (ICS) levels are adjustable on the front panel. All audio, except the S/T of the radio IN USE and any Type 'B' DIRECT AUDIO input signals, are muted during transmit for clarity. ICS operation allows transmit during any ICS mode by using the PTT switch.

3.8 AMS44 - Audio Alerting Functions

No internal audio alerting is provided in the AMS44. Two direct (unswitched) inputs are provided to allow airframe alerting signals to be routed to the pilot. See 3.10.5 (Auxiliary Inputs) for more information.

DIR AUD #1 is amplified by the Audio controller, and can not be heard when the Mode Switch is in the EMER position. DIR AUD #2 is not amplified, and is audible at all times.

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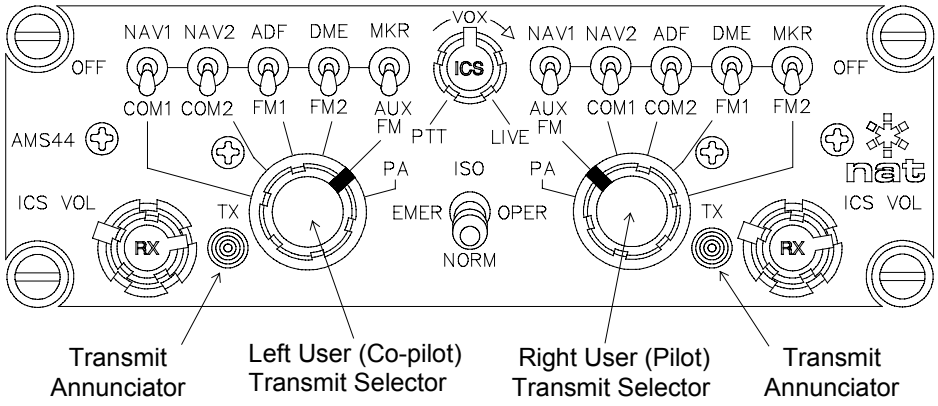
3.9 AMS44 - Selection of Transmit Functions



3.9.1 Transmit Selectors

The transmit selector controls are six position rotary switches, one on each side of the panel to correspond to the user on that side of the aircraft. The controls select the transmit function required by the relevant user. Each rotary selector switch is completely independent of the other, and the pilot and copilot have equal priority during transmit. When the PTT is activated, all audio selected on the side of the controller that is transmitting is muted, except the sidetone of the transceiver in use.

3.9.1.1 Automatic Receive Audio

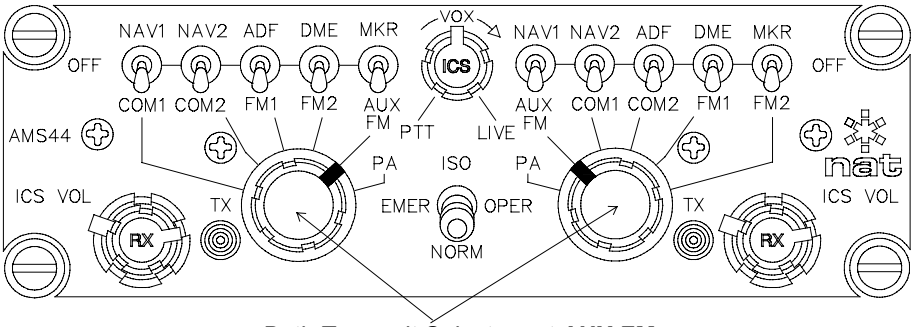
Receive audio is automatically selected as a function of the respective rotary selector switch. No additional switching is needed to establish external communication.

3.9.1.2 Transmit Annunciator

During transmit from either the pilot or copilot position, the appropriate TX annunciator (green) will light on the front panel.

3.9.1.3 TX Selector Example

In the figure that follows, the positions of the rotary selector switches indicate that the left and right sides of the controller are set for transmit operation on the AUX FM transceiver.



Both Transmit Selectors at **AUX FM**

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3.9.2 Hand Microphone

The hand mic functions without power and will work in emergency or equipment failure situations. The hand mic normally functions on the left side of the controller but can be connected to the right side at the time of installation by changing an internal switch.

When the hand mic or transmit PTT switch is activated, the mic involved will be coupled to the radio (or PA) selected. The TX annunciator will not light when the hand mic is used.

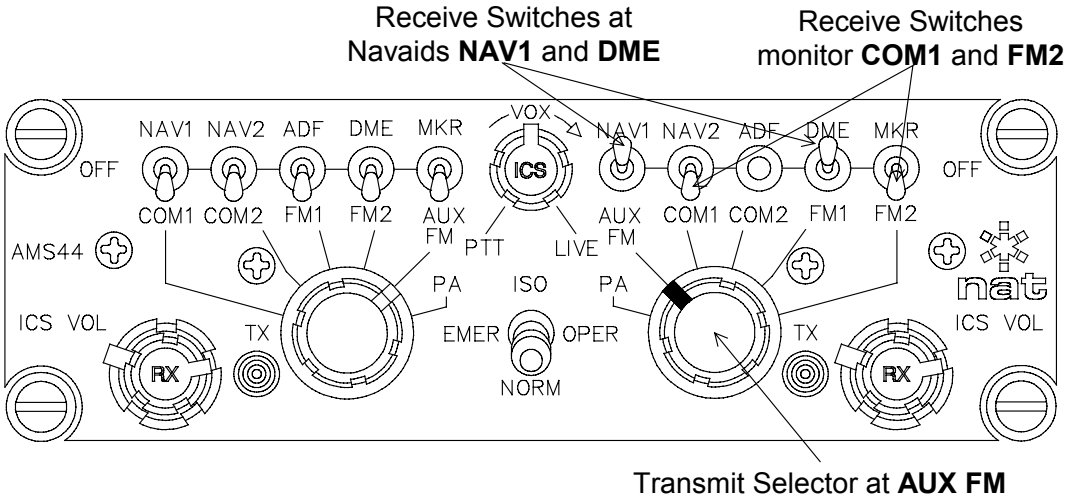
3.10 AMS44 - Transceiver Receive Functions

3.10.1 Receive Selection Switches

The Receive Audio select switches (white switch bats) are 'center-off' type with the 'up' position selecting the respective navaid receiver audio, and the 'down' position selecting the respective transceiver audio. See section 3.10.3.1 for RX volume control.

3.10.2 Transceiver Selection Examples

In the figure below, the right TX selector is set for transmit and receive operation on the **AUX FM**. The Receive function switches are also selected so the right side can monitor **COM1** and **FM2** transceivers as well as **NAV1** and **DME** navaids. Note that **PA**, **COM2**, **FM1**, **NAV2**, **ADF**, and **MKR** are not selected.



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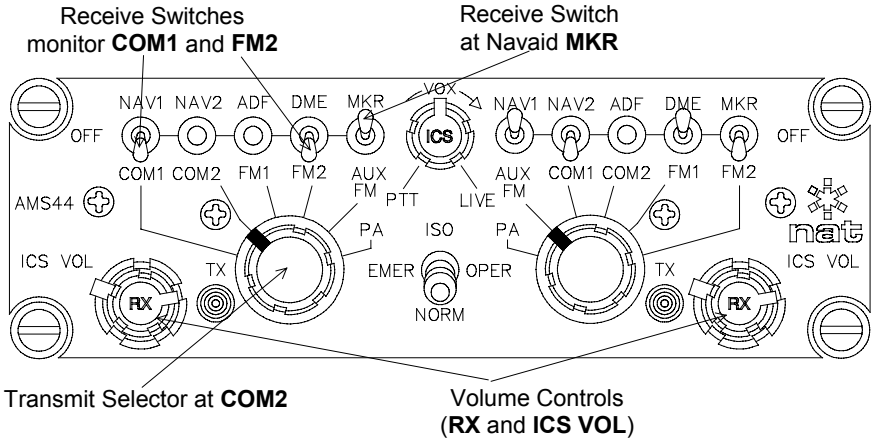
In the figure below, the right side configuration remains the same. The left side is set up to receive and transmit on **COM2** while monitoring **COM1** and **FM2** transceivers as well as the **MKR** navaid. Note that **FM1**, **AUX FM**, **PA**, **NAV1**, **NAV2**, **ADF** and **DME** are not selected on the left side.



3.10.3 Volume Controls

The controller features individual master **RX** and **ICS VOL** controls on both the left and right sides of the unit, which can be adjusted to suit the specific user's requirements.

3.10.3.1 RX Volume Control

The **RX** knobs are the smaller, topmost controls of the dual concentric volume control assemblies. The **RX VOL** controls provide adjustment of the RX audio selected by the controller from 10% to full. As in any audio system, it is important to set the individual radio volume controls to a nominal level that is acceptable to both pilots, *then* adjust the respective master **RX VOL** on the audio controller to suit user preference. The RX VOL controls are designd to provide a minimum level, even when set fully ccw.

All receive audio is muted during transmit (**NORM** and **ISO** mode).

3.10.3.2 ICS Volume Control

The **ICS VOL** knobs are the larger, bottom controls of the dual concentric volume control assemblies. The **ICS VOL** controls provide adjustment of the ICS audio selected by the controller. The ICS volume controls provide adjustment from 0 to full output. See also section 3.11.

3.10.4 Passenger Receive Audio Selection

The passengers normally hear the radio audio as selected on the left side of the controller. The passengers can be shifted to the right side by changing the setting of the internal **PAX** switch, accessible through the right side of the controller. The passengers will not hear any radio audio when the red mode switch is in the **EMER** position.

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3.10.5 Auxiliary Inputs

Two Direct Audio inputs are available. They are coupled directly to either the left or right side of the controller at the time of installation. The Direct Audio inputs are normally selected for the right side of the controller when the unit is shipped from the factory.

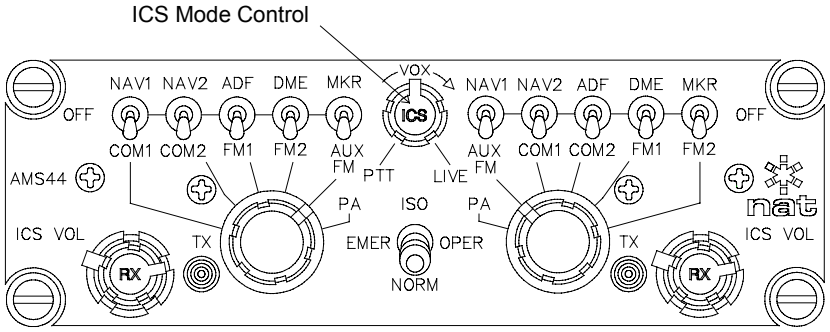
3.11 AMS44 - Intercom Functions

All ICS audio is controlled by the front panel ICS volume controls and may be varied to suit conditions. There are independent volume controls for the left and right sides of the controller. The **ICS VOL** are the larger, aft controls of the dual concentric volume control assemblies. See also section 3.10.3.2.

If the controller is operated in the emergency mode, ICS operation will continue (if there is no fault condition) between the passengers, but not between the pilot and copilot or passengers.

3.11.1 ICS Modes of Operation

Intercom system (ICS) audio may be implemented in three modes between users; **LIVE** (on constantly), **VOX** (voice activated), or **PTT** (active only when switched by ICS PTT switch). The ICS mode is selected by the control (labeled **ICS**) in the middle of the top switch row. It is common to use the **LIVE** mode during ground operations, start-up, etc., and to use **VOX** or **PTT** operation if conditions are so noisy that 'pilot fatigue' will result.



The desired ICS mode is selected by the ICS mode control knob.

PTT ICS (KEYED Operation)*****

ICS Mode Control set fully counter-clockwise into the switch detent.

LIVE (Hot Mic Operation)

ICS Mode Control set fully clockwise.

VOX (Voice Activated)

ICS Mode Control set fully clockwise, then slowly rotated counter-clockwise until the intercom just becomes 'quiet'. This setting will vary with ambient noise conditions, and the quality and number of microphones connected in the system.

***** KEYED operation is inherent to the pilot and copilot microphone circuits only.

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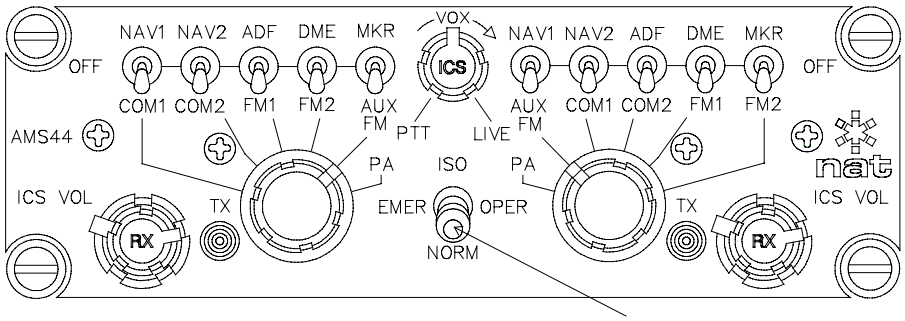
3.11.2 Passenger ICS Operation

Passenger ICS audio is LIVE when the controller is in the **LIVE** or **PTT** mode of ICS operation and are VOX triggered when a VOX setting is selected. *Note that the passengers are always LIVE unless interrupted by an in-line PTT cord, or the controller is set for **VOX** operation.*

Passenger and copilot (observer) operations can be maximized by using PTT type cord assemblies designed for use with NAT audio controllers.

CAUTION: Ensure that all PTT type cord assemblies have properly shielded mic and phone wiring, or 'crosstalk' will occur.

3.12 AMS44 - Mode Control



Mode Control Switch

The Mode Control switch is a three-position, locking toggle switch that is used to select between **ISO, EMER OPER**, and **NORM.** It is identified with a red cap.

3.12.1 Emergency Operation

The center (**EMER OPER**) position of the mode switch places the controller into the emergency operation mode. When switched to the **EMER OPER** position, both pilot and copilot controls are removed from the ICS bus and connected directly to their respective radios. This mode should be selected in the event of a box fault or power failure.

The Emergency function should be tested prior to flight to assure proper operation and allow the radio levels to be set adequately for emergency operation.

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3.12.1.1 Emergency Mode Effects

In the **EMER** mode, all functions are retained by the pilot and copilot, except ICS and possibly boom mic operation. If the box or airframe fault prevents the TX annunciator from lighting during transmit (indicating a failure in the mic keying circuit), then the hand mic should be used. A power fault of any kind will prevent the TX annunciator from lighting, giving an immediate indication of failure. If ICS audio is still available, then the power to the controller has not failed and loss of the TX light indicates TX switch failure.

Note that in the **EMER** mode, all switches work exactly as they do during **NORM** operation, except for the RX and ICS volume controls which will have no effect.

Any selected receive audio is switched to the appropriate user in the 'emergency' mode (red mode switch in the **EMER** position), but not to any passengers in the system. Level will be lower than **NORM** operation because the signals are obtained directly from the radios, bypassing the electronics in the controller. This is provided for failure situations which make operation impossible in the **NORM** mode (i.e., loss of power or amplifier failure, etc.)

3.12.2 Isolation Operation

The mode switch can select an **ISO** function, which prevents the selected user from receiving ICS audio. This is useful when passengers are interfering with critical flight operations (landing, etc.). It can be preselected at installation to isolate the left or right side. Intercom operation for the passengers and copilot is not affected. It is normally set for isolation of the right side when the unit is shipped from the factory.

End of Section 3.0

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